FINAL DECISION
Jemena distribution determination
2016 to 2020

Attachment 6 – Capital expenditure

May 2016

AUSTRALIAN ENERGY REGULATOR

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Note

This attachment forms part of the AER's final decision on Jemena's distribution determination for 2016–20. It should be read with all other parts of the final decision.

The final decision includes the following documents:

Overview

Attachment 1 – Annual revenue requirement

Attachment 2 – Regulatory asset base

Attachment 3 – Rate of return

Attachment 4 – Value of imputation credits

Attachment 5 – Regulatory depreciation

Attachment 6 – Capital expenditure

Attachment 7 – Operating expenditure

Attachment 8 – Corporate income tax

Attachment 9 – Efficiency benefit sharing scheme

Attachment 10 – Capital expenditure sharing scheme

Attachment 11 – Service target performance incentive scheme

Attachment 12 – Demand management incentive scheme

Attachment 13 – Classification of services

Attachment 14 – Control mechanisms

Attachment 15 – Pass through events

Attachment 16 – Alternative control services

Attachment 17 – Negotiated services framework and criteria

Attachment 18 – f-factor scheme

Contents

Shortened forms

Shortened form	Extended form
AEMC	Australian Energy Market Commission
AEMO	Australian Energy Market Operator
AER	Australian Energy Regulator
AMI	Advanced metering infrastructure
augex	augmentation expenditure
capex	capital expenditure
CCP	Consumer Challenge Panel
CESS	capital expenditure sharing scheme
CPI	consumer price index
DRP	debt risk premium
DMIA	demand management innovation allowance
DMIS	demand management incentive scheme
distributor	distribution network service provider
DUoS	distribution use of system
EBSS	efficiency benefit sharing scheme
ERP	equity risk premium
Expenditure Assessment Guideline	Expenditure Forecast Assessment Guideline for Electricity Distribution
F&A	framework and approach
MRP	market risk premium
NEL	national electricity law
NEM	national electricity market
NEO	national electricity objective
NER	national electricity rules
NSP	network service provider
opex	operating expenditure
PPI	partial performance indicators
PTRM	post-tax revenue model
RAB	regulatory asset base
RBA	Reserve Bank of Australia

Shortened form	Extended form
repex	replacement expenditure
RFM	roll forward model
RIN	regulatory information notice
RPP	revenue and pricing principles
SAIDI	system average interruption duration index
SAIFI	system average interruption frequency index
SLCAPM	Sharpe-Lintner capital asset pricing model
STPIS	service target performance incentive scheme
WACC	weighted average cost of capital

6 Capital expenditure

Capital expenditure (capex) refers to the investment made in the network to provide standard control services. This investment mostly relates to assets with long lives (30–50 years is typical) and these costs are recovered over several regulatory periods. On an annual basis, however, the financing cost and depreciation associated with these assets are recovered (return of and on capital) as part of the building blocks that form Jemena's total revenue requirement.[1]

This attachment sets out our final decision on Jemena's total forecast capex. Further detailed analysis is in the following appendices:

- Appendix A - Assessment techniques
- Appendix B - Assessment of capex drivers
- Appendix C - Demand.

6.1 Final decision

We are satisfied Jemena's proposed total forecast capex of $709.3 million ($2015) reasonably reflects the capex criteria. This is 11 per cent greater than actual/estimated capex for the 2011–15 regulatory control period ($641.9 million). Table 6.1 outlines our final decision.

Table 6.1 Final decision on Jemena's total forecast capex ($2015, million)

	2016	2017	2018	2019	2020	Total
Jemena's revised proposal	138.1	172.0	140.1	138.2	120.9	709.3
AER final decision	138.1	172.0	140.1	138.2	120.9	709.3
Difference	0.0	0.0	0.0	0.0	0.0	0.0
Percentage difference (%)	0.0	0.0	0.0	0.0	0.0	0.0

Source: AER analysis.

Note: Numbers may not add up due to rounding.
The figures above do not include equity raising costs and capital contributions. For our assessment of equity raising costs, see attachment 3.

Table 6.2 summarises our findings and the reasons for our final decision.

These reasons include our responses to stakeholders' submissions on Jemena's revised regulatory proposal. In the table we present our reasons by 'capex driver' (for

[1] NER, cl. 6.4.3(a).

example, augmentation, replacement, and connections). This reflects the way in which we tested Jemena's total forecast capex. Our testing used techniques tailored to the different capex drivers, taking into account the best available evidence. Following our assessment we are satisfied that Jemena's proposed total forecast capex is consistent with the requirements of the NER.[2]

Our findings on the capex drivers are part of our broader analysis and should not be considered in isolation. Our final decision concerns Jemena's total forecast capex for the 2016–20 period. We do not approve an amount of forecast expenditure for each capex driver. However, we use our findings on the different capex drivers to arrive at our final decision on an estimate for total capex that meets the requirements of the NER (see section 6.3 for a detailed discussion).

Table 6.2 Summary of AER reasons and findings

Issue	Reasons and findings
Total capex forecast	Jemena proposed a total capex forecast of $709.3 million ($2015) in its revised proposal. We are satisfied this forecast reasonably reflects the capex criteria. The reasons for this decision are summarised in this table and detailed in the remainder of this attachment.
Forecasting methodology, key assumptions and past capex performance	We consider Jemena's key assumptions and forecasting methodology are generally reasonable..
Augmentation capex	We accept Jemena's forecast augex of $104.5 million ($2015). We also accept Jemena's proposed $27.5 million ($2015) capex for its Preston conversion project. Jemena originally classified this capex as augex but added it to its asset replacement capex (repex) in its revised proposal. Having assessed the revised proposal, we are of the view that the Preston redevelopment project is best categorised as augex (see also our repex decision). While this affects the mix of augex and repex in our final decision, it does not affect the total net capex decision as it is simply a reclassification.
Customer connections capex	We have included the amount Jemena has forecast for connections capex of $172.1 million ($2015) in our capex decision. Our preliminary decision accepted Jemena's proposed gross connection capex. However, we considered the Melbourne airport expansion was better characterised as augmentation and we included it as augex in our preliminary decision. In its revised proposal Jemena accepted our preliminary decision for gross connections capex. Jemena also reassessed the scope of the Melbourne Airport precinct project and re-categorised all components of this expenditure as connections capex. Jemena now forecasts that the funding for the Melbourne Airport precinct project will come through an upfront customer contribution and future customer-specific tariffs. We have assessed Jemena's supporting material regarding the Melbourne Airport expansion and we are satisfied that Jemena has demonstrated that the amount forecast represents connections capex and reasonably reflects the capex criteria.
Asset replacement capex (repex)	We accept Jemena's proposed repex forecast of $224 million ($2015), not including the Preston Conversion project, reasonably reflects the capex criteria. As noted above, we have assessed Jemena's proposed capex for the Preston Conversion project as augex.
Non-network capex	We accept Jemena's proposed non-network capex of $161.7 million ($2015) as a

[2] NER, cll. 6.5.7(c) and (d).

Issue	Reasons and findings
	reasonable estimate of the efficient costs a prudent operator would require for this category. In reaching this view, we accept Jemena's forecast capex for its 'Power of Choice' program is prudent and efficient.
Capitalised overheads	We accept Jemena's forecast of proposed capitalised overheads of $168.6 million ($2015). We are satisfied that this amount reasonably reflects the capex criteria.
Real cost escalators	Jemena accepted the AER's application of CPI indexation as a proxy for forecasts of escalation of materials costs in real terms over the 2016–20 regulatory control period. Jemena accepted our approach to labour escalators in our preliminary decision. We have updated the labour escalation rates in our preliminary decision and those used by Jemena in its revised proposal. We discuss our assessment of forecast labour price growth for Jemena in attachment 7. The difference between the impact of the real labour cost escalations proposed by Jemena and those accepted in our capex decision is $3.7 million ($2015). However, as we consider that our total alternative capex forecast is not materially different from Jemena's revised proposal we are satisfied that Jemena's estimate reasonably reflects the capex criteria. Accordingly, we have not applied the adjustment for real cost escalation.

Source: AER analysis.

We consider that Jemena's forecast addresses the revenue and pricing principles. In particular, we consider its forecast provides it with a reasonable opportunity to recover at least the efficient costs it incurs in:[3]

- providing direct control network services; and
- complying with its regulatory obligations and requirements.

As set out in appendix B we are satisfied that Jemena's overall capex forecast is consistent with the national electricity objective (NEO). We consider our decision to accept Jemena's forecast capex promotes efficient investment in, and efficient operation and use of, electricity services for the long term interests of consumers of electricity.

We also consider that overall the forecast addresses the capital expenditure objectives.[4] In making our final decision, we specifically considered the impact our decision will have on the safety and reliability of Jemena's network. We consider this capex forecast should be sufficient for a prudent and efficient service provider in Jemena's circumstances to be able to maintain the safety, service quality, security and reliability of its network consistent with its current obligations.

[3] NEL, s. 7A.

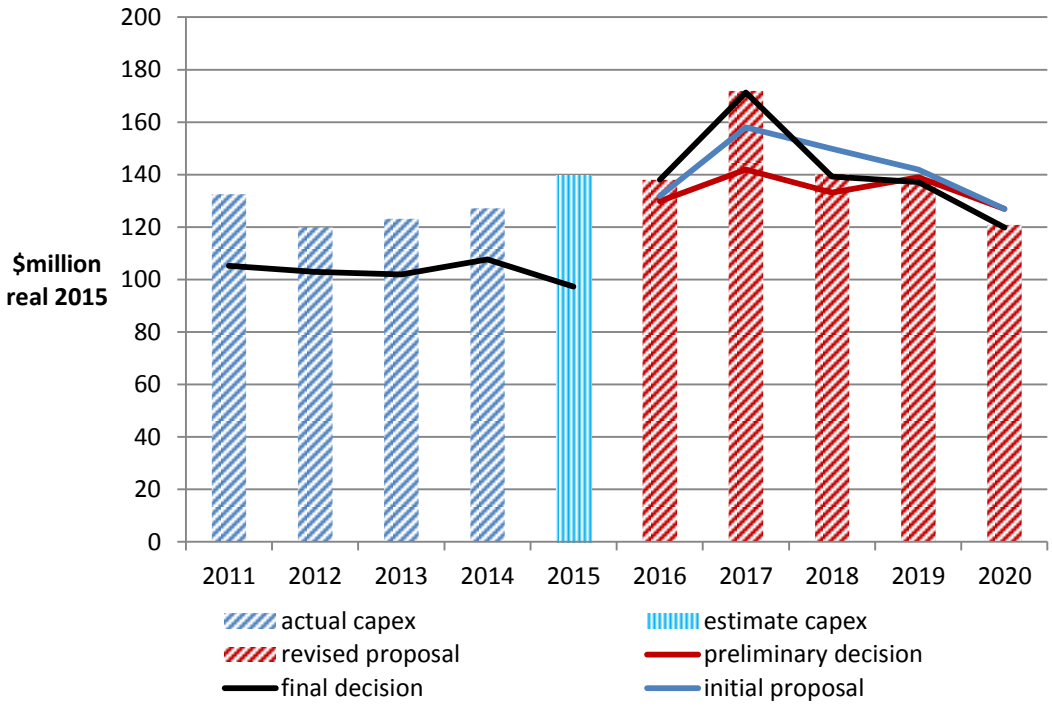
[4] NER, cl. 6.5.7(a).

6.2 Jemena's revised proposal

Jemena's revised proposal was for total forecast capex of $709.3 million ($2015) for the 2016–20 regulatory control period. This is 5.5 per cent higher than our preliminary decision, and 0.1 per cent higher than Jemena's initial regulatory proposal.

Figure 6.1 shows the difference between Jemena's initial proposal, its revised proposal and our preliminary decision for the 2016–20 regulatory control period, as well as the actual/estimated capex that Jemena spent during the 2011–15 regulatory control period.

Figure 6.1 Jemena's total actual/estimated and forecast capex 2011–2020



Source: AER analysis.

Jemena submitted that costs associated with the delivery of the Australian Energy Market Commission's (AEMC's) Power of Choice program and associated rule changes have resulted in the increased capex forecast when compared with its initial proposal. This expenditure was not included in its initial proposal. Jemena submitted that, since submitting its initial proposal, the AEMC finalised a number of Power of Choice rule changes that provided it with the necessary certainty to include the forecast capex in its revised proposal.[5]

[5] Jemena, *Revised regulatory proposal, Attachment 7-1 capital expenditure,* January 2015, p. viii.

6.3 Assessment approach

This section outlines our approach to capex assessments. It sets out the relevant legislative and rule requirements, and outlines our assessment techniques. It also explains how we derive an alternative estimate of total forecast capex against which we compare the distributor's total forecast capex. The information Jemena provided in its revised regulatory proposal, including its response to our RIN, is a vital part of our assessment. We also took into account information that Jemena provided in response to our information requests, and submissions from other stakeholders.

Our assessment approach involves the following steps:

- Our starting point for building an alternative estimate is the distributor's revised regulatory proposal.[6] We apply our various assessment techniques, both qualitative and quantitative, to assess the different elements of the distributor's proposal. This analysis informs our view on whether the distributor's proposal reasonably reflects the capex criteria in the NER at the total capex level.[7] It also provides us with an alternative forecast that we consider meets the criteria. In arriving at our alternative estimate, we weight the various techniques we used in our assessment. We give more weight to techniques we consider are more robust in the particular circumstances of the assessment.
- Having established our alternative estimate of the *total* forecast capex, we can test the distributor's total forecast capex. This includes comparing our alternative estimate total with the distributor's total forecast capex and what the reasons for any differences are. If there is a difference between the two, we may need to exercise our judgement as to what is a reasonable margin of difference.

If we are satisfied the distributor's proposal reasonably reflects the capex criteria in meeting the capex objectives, we will accept it. The capital expenditure objectives (capex objectives) referred to in the capex criteria, are to:[8]

- meet or manage the expected demand for standard control services over the period
- comply with all regulatory obligations or requirements associated with the provision of standard control services
- to the extent that there are no such obligations or requirements, maintain service quality, reliability and security of supply of standard control services and maintain the reliability and security of the distribution system
- maintain the safety of the distribution system through the supply of standard control services.

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6 AER, *Better regulation: Explanatory statement: Expenditure forecast assessment guideline*, November 2013, p. 7; see also AEMC, *Final rule determination: National electricity amendment (Economic regulation of network service providers) Rule 2012*, 29 November 2012, pp. 111 and 112.

7 NER, cl. 6.5.7(c).

8 NER, cl. 6.5.7(a).

If we are not satisfied, the NER requires us to put in place a substitute estimate that we are satisfied reasonably reflects the capex criteria.[9] Where we have done this, our substitute estimate is based on our alternative estimate.

The capex criteria are: [10]

- the efficient costs of achieving the capital expenditure objectives
- the costs that a prudent operator would require to achieve the capital expenditure objectives
- a realistic expectation of the demand forecast and cost inputs required to achieve the capital expenditure objectives.

The AEMC noted '[t]hese criteria broadly reflect the NEO [National Electricity Objective]'.[11]

Importantly, we approve a total capex forecast and not particular categories, projects or programs in the capex forecast. Our review of particular categories or projects informs our assessment of the total capex forecast. The AEMC stated:[12]

> It should be noted here that what the AER approves in this context is expenditure allowances, not projects.

In deciding whether we are satisfied that Jemena's proposed total forecast capex reasonably reflects the capex criteria, we have regard to the capex factors.[13] In taking the capex factors into account, the AEMC noted:[14]

> …this does not mean that every factor will be relevant to every aspect of every regulatory determination the AER makes. The AER may decide that certain factors are not relevant in certain cases once it has considered them.

Table 6.5 summarises how we took the capex factors into consideration.

More broadly, we note that in exercising our discretion, we take into account the revenue and pricing principles set out in the NEL.[15] In particular, we take into account whether our overall capex forecast provides Jemena a reasonable opportunity to recover at least the efficient costs it incurs in:[16]

- providing direct control network services; and

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9 NER, cl. 6.12.1(3)(ii).

10 NER, cl. 6.5.7(c).

11 AEMC, *Final rule determination: National electricity amendment (Economic regulation of network service providers) Rule 2012*, 29 November 2012, p. 113.

12 AEMC, *Final rule determination: National electricity amendment (Economic regulation of network service providers) Rule 2012*, 29 November 2012, p. vii.

13 NER, cl. 6.5.7(e).

14 AEMC, *Final rule determination: National electricity amendment (Economic regulation of network service providers) Rule 2012*, 29 November 2012, p. 115.

15 NEL, ss. 7A and 16(2).

16 NEL, s. 7A.

- complying with its regulatory obligations and requirements.

6.3.1 Expenditure assessment guideline

The rule changes the AEMC made in November 2012 required us to make and publish an Expenditure Forecast Assessment Guideline for electricity distribution (Guideline).[17] We released our Guideline in November 2013.[18] The Guideline sets out our proposed general approach to assessing capex (and opex) forecasts. The rule changes also require us to set out our approach to assessing capex in the relevant framework and approach paper. For Jemena, our framework and approach paper stated that we would apply the Guideline, including the assessment techniques outlined in it.[19] We may depart from our Guideline approach and if we do so, we need to provide reasons. In this determination, we have not departed from the approach set out in our Guideline.

We note that RIN data forms part of a distributor's regulatory proposal.[20] In our Guideline we stated we would "require all the data that facilitate the application of our assessment approach and assessment techniques". We also stated that the RIN we issue in advance of a distributor lodging its regulatory proposal would specify the exact information we require.[21] Our Guideline made clear our intention to rely upon RIN data during distribution determinations.

6.3.2 Building an alternative estimate of total forecast capex

The following section sets out the approach we apply to arrive at an alternative estimate of total forecast capex.

Our starting point for building an alternative estimate is the distributor's proposal.[22] We review the proposed forecast methodology and the key assumptions that underlie the distributor's forecast. We also consider the distributor's performance in the previous regulatory control period to inform our alternative estimate.

We then apply our specific assessment techniques to develop an estimate and assess the economic justifications that the distributor puts forward. Many of our techniques encompass the capex factors that we are required to take into account. Appendix A and appendix B contain further details on each of these techniques.

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17 AEMC, *Final rule determination: National electricity amendment (Economic regulation of network service providers) Rule 2012*, 29 November 2012, p. 114.

18 AER, *Better regulation: Expenditure forecast assessment guideline for electricity distribution*, November 2013.

19 AER, *Final Framework and approach for the Victorian Electricity Distributors: Regulatory control period commencing 1 January 2016*, 24 October 2014, pp. 119–120.

20 NER, cll. 6.8.2(c2) and (d).

21 AER, *Better regulation: Expenditure forecast assessment guideline for electricity distribution*, November 2013, p. 25.

22 AER, *Better regulation: Explanatory statement: Expenditure forecast assessment guideline*, November 2013, p. 7; AEMC, *Final rule determination: National electricity amendment (Economic regulation of network service providers) Rule 2012*, 29 November 2012, pp. 111 and 112.

Some of these techniques focus on total capex; others focus on high level, standardised sub-categories of capex. Importantly, while we may consider certain projects and programs in forming a view on the total capex forecast, we do not determine which projects or programs the distributor should or should not undertake. This is consistent with the regulatory framework and the AEMC's statement that the AER does not approve specific projects. Rather, we approve an overall revenue requirement that includes an assessment of what we find to be an efficient total capex forecast.[23]

We determine total revenue by reference to our analysis of the proposed capex and the various building blocks. Once we approve total revenue, the distributor is able to prioritise its capex program given its circumstances over the course of the regulatory control period. The distributor may need to undertake projects or programs it did not anticipate during the distribution determination. The distributor may also not require some of the projects or programs it proposed for the regulatory control period. We consider a prudent and efficient distributor would consider the changing environment throughout the regulatory control period in its decision-making.

As we explained in our Guideline:[24]

> Our assessment techniques may complement each other in terms of the information they provide. This holistic approach gives us the ability to use all of these techniques, and refine them over time. The extent to which we use each technique will vary depending on the expenditure proposal we are assessing, but we intend to consider the inter-connections between our assessment techniques when determining total capex … forecasts. We typically would not infer the findings of an assessment technique in isolation from other techniques.

In arriving at our estimate, we weight the various techniques we used in our assessment. We weight these techniques on a case by case basis using our judgement. Broadly, we give more weight to techniques we consider are more robust in the particular circumstances of the assessment. By relying on a number of techniques, we ensure we consider a wide variety of information and can take a holistic approach to assessing the distributor's capex forecast.

Where our techniques involve the use of a consultant, we consider their reports as one of the inputs to arriving at our final decision on overall capex. Our final decision clearly sets out the extent to which we accept our consultants' findings. Where we apply our consultants' findings, we do so only after carefully reviewing their analysis and conclusions, and evaluating these against outcomes of our other techniques and our examination of Jemena's revised proposal.

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[23] AEMC, *Final rule determination: National electricity amendment (Economic regulation of network service providers) Rule 2012*, 29 November 2012, p. vii.

[24] AER, *Better regulation: Expenditure forecast assessment guideline for electricity distribution*, November 2013, p. 12.

We also take into account the various interrelationships between the total forecast capex and other components of a distributor's distribution determination. The other components that directly affect the total forecast capex include:

- forecast opex
- forecast demand
- the service target performance incentive scheme
- the capital expenditure sharing scheme
- real cost escalation
- contingent projects.

We discuss how these components impact the total forecast capex in Table 6.4.

Underlying our approach are two general assumptions:

- The capex criteria relating to a prudent operator and efficient costs are complementary. Prudent and efficient expenditure reflects the lowest long-term cost to consumers for the most appropriate investment or activity required to achieve the expenditure objectives.[25]
- Past expenditure was sufficient for the distributor to manage and operate its network in past periods, in a manner that achieved the capex objectives.[26]

6.3.3 Comparing the distributor's proposal with our alternative estimate

Having established our estimate of the total forecast capex, we can test the distributor's proposed total forecast capex. This includes comparing our alternative estimate of forecast total capex with the distributor's proposal. The distributor's forecast methodology and its key assumptions may explain any differences between our alternative estimate and its proposal.

As the AEMC foreshadowed, we may need to exercise our judgement in determining whether any 'margin of difference' is reasonable:[27]

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[25] AER, *Better regulation: Expenditure forecast assessment guideline for electricity distribution*, November 2013, pp. 8 and 9. The Australian Competition Tribunal has previously endorsed this approach: see : Application by Ergon Energy Corporation Limited (Non-system property capital expenditure) (No 4) [2010] ACompT 12; Application by Energy Australia and Others [2009] ACompT 8; Application by Ergon Energy Corporation Limited (Labour Cost Escalators) (No 3) [2010] ACompT 11; Application by DBNGP (WA) Transmission Pty Ltd (No 3) [2012] ACompT 14; Application by United Energy Distribution Pty Limited [2012] ACompT 1; Re: Application by ElectraNet Pty Limited (No 3) [2008] ACompT 3 ; Application by DBNGP (WA).

[26] AER, *Better regulation: Expenditure forecast assessment guideline for electricity distribution*, November 2013, p. 9.

[27] AEMC, *Final rule determination: National electricity amendment (Economic regulation of network service providers) Rule 2012*, 29 November 2012, p. 112.

> The AER could be expected to approach the assessment of a NSP's expenditure (capex or opex) forecast by determining its own forecast of expenditure based on the material before it. Presumably this will never match exactly the amount proposed by the NSP. However there will be a certain margin of difference between the AER's forecast and that of the NSP within which the AER could say that the NSP's forecast is reasonable. What the margin is in a particular case, and therefore what the AER will accept as reasonable, is a matter for the AER exercising its regulatory judgment.

As noted above, we draw on a range of techniques, as well as our assessment of elements that impact upon capex such as demand and real cost escalators.

Our decision on the total forecast capex does not strictly limit a distributor's actual spending. A distributor might spend more on capex than the total forecast capex amount specified in our decision in response to unanticipated expenditure needs.

The regulatory framework has a number of mechanisms to deal with such circumstances. Importantly, a distributor does not bear the full cost where unexpected events lead to an overspend of the approved capex forecast. Rather, the distributor bears 30 per cent of this cost if the expenditure is subsequently found to be prudent and efficient. Further, the pass through provisions provide a means for a distributor to pass on significant, unexpected capex to customers, where appropriate.[28] Similarly, a distributor may spend less than the capex forecast because they have been more efficient than expected. In this case the distributor will keep on average 30 per cent of this reduction over time.

We set our alternative estimate at the level where the distributor has a reasonable opportunity to recover efficient costs. The regulatory framework allows the distributor to respond to any unanticipated issues that arise during the regulatory control period. In the event that this leads to the approved total revenue underestimating the total capex required, the distributor should have sufficient flexibility to allow it to meet its safety and reliability obligations by reallocating its budget. Conversely, if there is an overestimation, the stronger incentives the AEMC put in place in 2012 should result in the distributor only spending what is efficient. As noted, the distributor and consumers share the benefits of the underspend and the costs of an overspend under the regulatory regime.

6.4 Reasons for final decision

We applied the assessment approach set out in section 6.3 to Jemena. In this final decision, we are satisfied Jemena's total forecast capex reasonably reflects the capex criteria. We compared Jemena's capex forecast to the alternative capex forecast we constructed using the approach and techniques outlined in appendices A and B.

[28] NER, r. 6.6.

In constructing our alternative capex forecast, we arrived at an amount of $705.6 million based on a lower amount for labour escalation. However, as we consider that Jemena's revised proposal is not materially different from our alternative estimate, we are satisfied that Jemena's estimate reasonably reflects the capex criteria.

Table 6.3 sets out the capex amounts by driver that we included in our estimate of Jemena's total forecast capex for the 2016–20 regulatory control period.

Table 6.3 Our assessment of required capex by capex driver 2016–20 ($2015, million)

Category	2016	2017	2018	2019	2020	Total
Augmentation	16.6	44.5	37.5	23.1	10.3	132.0
Connections	33.2	41.6	31.9	32.5	32.8	172.1
Replacement	36.8	41.6	40.5	54.1	55.1	228.1
Non-Network	49.2	42.9	26.1	24.1	19.4	161.7
Capitalised overheads	31.9	33.2	33.3	34.7	35.5	168.6
Gross Capex (includes capital contributions)	**167.8**	**203.8**	**169.3**	**168.5**	**153.1**	**862.5**
Capital Contributions	29.7	31.9	29.2	30.3	32.2	153.2
Net Capex (excluding capital contributions)	**138.1**	**172.0**	**140.1**	**138.2**	**120.9**	**709.3**

Source: AER analysis.

Note: Numbers may not add up due to rounding.

Our approved capex of $709.3 million is $37.2 million higher than our preliminary decision of $672.1 million. The key components of our capex decision that have changed include:

- increased augex ($39.5 million) reflecting our acceptance of Jemena's proposed Preston conversion project, Sunbury and Flemington projects as we consider that the new information submitted by Jemena addressed the concerns raised in our preliminary decision
- increased non-network ICT capex for Power of Choice ($25.4 million) and RIN compliance ($2.1 million) as a result of new regulatory obligations.

We discuss our assessment of Jemena's forecasting methodology, key assumptions and past capex performance in the sections below.

Our assessment of capex drivers are in appendices A and B. These set out the application of our assessment techniques to the capex drivers, and the weighting we gave to particular techniques. We used our reasoning in the appendices to form our alternative estimate.

6.4.1 Key assumptions

The NER require Jemena to include in its regulatory proposal the key assumptions that underlie its proposed forecast capex and a certification by its Directors that those key assumptions are reasonable.[29]

In our draft determination we noted that the key assumptions that underlie Jemena's proposed forecast capex are unclear.[30] In its revised proposal, Jemena has more clearly set out its key assumptions and identified additional material to show how its key assumptions have influenced its forecasts. These assumptions include:[31]

- spatial peak demand forecasts
- customer growth assumptions
- assumptions within Jemena's forecasting method document
- labour rate and material escalators.

We have assessed Jemena's key assumptions in the appendices to this capex attachment.

6.4.2 Forecasting methodology

The NER require Jemena to inform us about the methodology it proposes to use to prepare its forecast capex allowance before it submits its regulatory proposal.[32] Jemena must include this information in its regulatory proposal.[33]

In our preliminary decision we considered that Jemena's forecasting methodology is generally reasonable.[34] We maintain this position in this final decision. Where we identified specific areas of concern, we discuss these in the appendices to this capex attachment.

Origin and VECUA maintained their support for applying a combination of top-down and bottom-up assessment techniques. They considered this is necessary to ensure that forecast costs, including unit rates, are not overstated. A combined approach ensures inter-relationships and synergies between projects or areas of work, which are more readily identified at a portfolio level, are adequately accounted for.[35] AGL also

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29 NER, cll. S6.1.1(2), (4) and (5).

30 AER, *Preliminary decision, Jemena distribution determination 2016 to 2020, Attachment 6 – Capital expenditure,* October 2015, pp. 19–20.

31 Jemena, *Revised regulatory proposal, Attachment 7-1 capital expenditure,* January 2015, pp. 5–6.

32 NER, cll. 6.8.1A and 11.6.3(c).

33 NER, cl. S6.1.1(2).

34 AER, *Preliminary decision, Jemena distribution determination 2016 to 2020, Attachment 6 – Capital expenditure,* October 2015, pp. 20–21.

35 Origin, *Submission to AER preliminary decision Victorian networks*, 6 January 2016, p. 2; VECUA, *Submission: AER preliminary 2016–20 revenue determinations for the Victorian DNSPs*, 6 January 2016, p. 27.

supported our use of benchmarking as an input into determining total capex (and opex) forecasts.[36]

As we noted in previous determinations, the drawback of deriving a capex forecast through a bottom-up assessment is it does not of itself provide sufficient evidence that the estimate is efficient. Bottom up approaches tend to overstate required allowances as they do not adequately account for inter-relationships and synergies between projects or areas of work. In contrast, reviewing aggregated areas of expenditure or the total expenditure, allows for an overall assessment of efficiency.[37]

Importantly, we do not limit our capex assessment to top-down methods. We utilise a holistic assessment approach that include techniques such as predictive modelling and detailed technical reviews (see section 6.3 and appendix A).

6.4.3 Interaction with the STPIS

We consider our approved capital expenditure forecast is consistent with the setting of targets under the STPIS. In particular, we should not set the capex allowance such that it would lead to Jemena systematically under or over performing against its STPIS targets. We consider our approved capex forecast is sufficient to allow a prudent and efficient service provider in Jemena's circumstances to maintain performance at the targets set under the STPIS. As such, it is appropriate to apply the STPIS as set out in attachment 11.

In making our final decision, we specifically considered the impact our decision will have on the safety and reliability of Jemena's network.

In its submission on the initial proposal, the Consumer Challenge Panel (CCP) noted the following explanation from the AEMC:[38]

> …operating and capital expenditure allowances for NSPs should be no more than the level considered necessary to comply with the relevant regulatory obligation or requirement, where these have been set by the body allocated to that role. Expenditure by NSPs to achieve standards above these levels should be unnecessary, as they are only required to deliver to the standards set. It would also amount to the AER substituting a regulatory obligation or requirement with its own views on the appropriate level of reliability, which would undermine the role of the standard setting body, and create uncertainty and duplication of roles.

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[36] AGL, *Submission: AER preliminary decision on the Victorian electricity distribution network regulatory proposals*, 7 January 2016, p. 1.

[37] For example, see AER, *Final decision: Ergon Energy determination 2015−16 to 2019−20: Attachment 6 − Capital expenditure*, October 2015, p. 21; AER, *Final decision: SA Power Networks determination 2015−16 to 2019−20: Attachment 6 − Capital expenditure*, October 2015, pp. 20–21.

[38] CCP, *Advice to the AER: AER's Preliminary Decision for SA Power Networks for 2015–20 and SA Power Networks' revised regulatory proposal*, August 2015, p. 27.

> NSPs are still free to make incremental improvements over and above the regulatory requirements at their own discretion. Such additional expenditure will not generally be recoverable, through forecast capital and operating expenditure. However, DNSPs are also provided with annual financial incentives to improve reliability performance under the STPIS.

We consider our substitute estimate is sufficient for Jemena to maintain the safety, service quality and reliability of its network consistent with its obligations. Our provision of a total capex forecast does not constrain a distributor's actual spending—either as a cap or as a requirement that the forecast be spent on specific projects or activities. It is conceivable that a distributor might wish to spend particular capital expenditure differently or in excess of the total capex forecast in our decision. However, such additional expenditure is not included in our assessment of expenditure forecasts as it is not required to meet the capex objectives. We consider the STPIS is the appropriate mechanism to provide distributors with the incentive to improve reliability performance where such improvements reflect value to the energy customer.

Under our analysis of specific capex drivers, we explained how our analysis and certain assessment techniques factor in safety and reliability obligations and requirements.

6.4.4 Jemena's capex performance

We have looked at a number of historical metrics of Jemena's capex performance against that of other distributors in the NEM. We also compare Jemena's proposed forecast capex allowance against historical trends. These metrics are largely based on outputs of the annual benchmarking report and other analysis undertaken using data provided by the distributors for the annual benchmarking report. The report includes Jemena's relative partial and multilateral total factor productivity (MTFP) performance, capex per customer and maximum demand, and Jemena's historic capex trend.

The NER sets out that we must have regard to our annual benchmarking report.[39] This section shows how we have taken it into account. We consider that this high level benchmarking at the overall capex level is suitable to gain an overall understanding of Jemena's proposal in a broader context. However, in our capex assessment we have not relied on our high level benchmarking metrics set out below other than to gain a high level insight into Jemena's proposal. We have not used this analysis deterministically in our capex assessment.

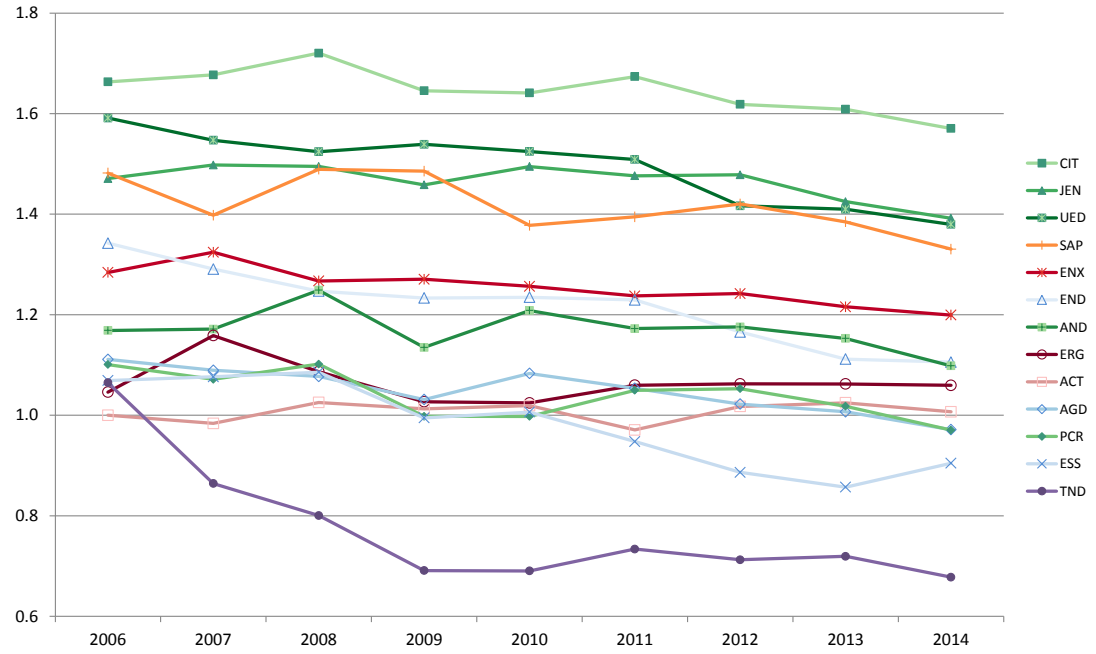
6.4.4.1 Partial factor productivity of capital and multilateral total factor productivity

Figure 6.2 shows a measure of partial factor productivity of capital taken from our benchmarking report. It simultaneously considers the productivity of each DNSP's use of overhead lines and underground cables (split into distribution and sub-transmission

[39] NER, cl. 6.5.7(e).

voltages) and transformers and other capital. Jemena performs relatively well on this measure, falling behind only CitiPower, and United Energy from 2006 to 2011. Jemena outperformed United Energy from 2012 to 2014.

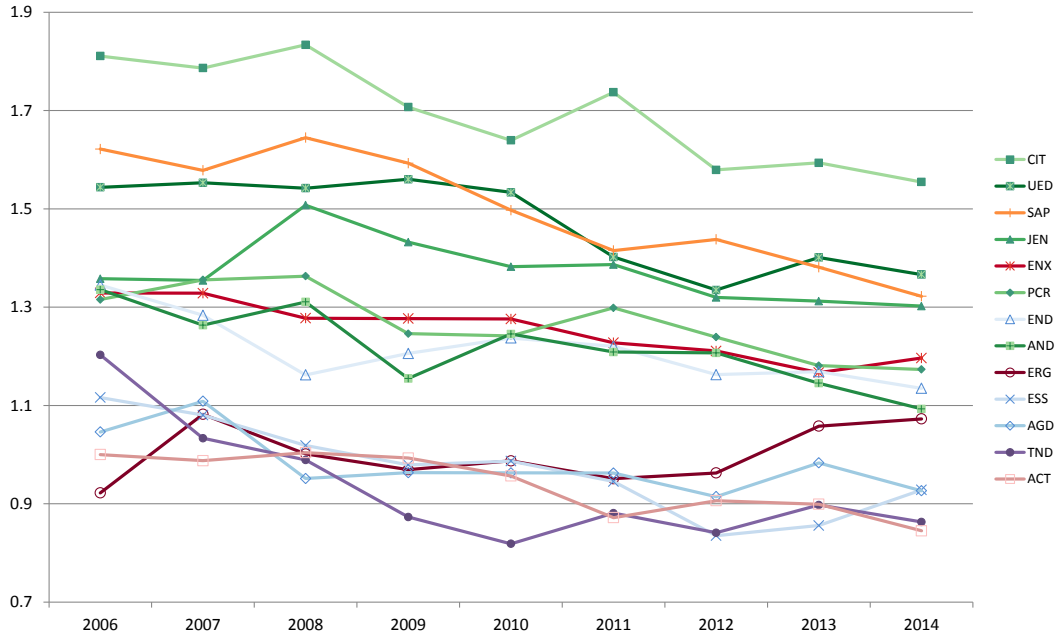
Figure 6.2 Capital partial factor productivity for 2006–14



Source: AER, *Annual benchmarking report: Electricity distribution network service providers*, November 2015, p. 11.

Figure 6.3 shows Jemena ranks similarly on MTFP. MTFP measures how efficient a business is in terms of its inputs (costs) and outputs (energy delivered, customer numbers, ratcheted maximum demand, reliability and circuit line length). Jemena is the fourth highest performer on this metric, falling behind CitiPower, SA Power Networks, and United Energy.

Figure 6.3 Multilateral total factor productivity for 2006–14



Source: AER, *Annual benchmarking report: Electricity distribution network service providers*, November 2015, p. 8.

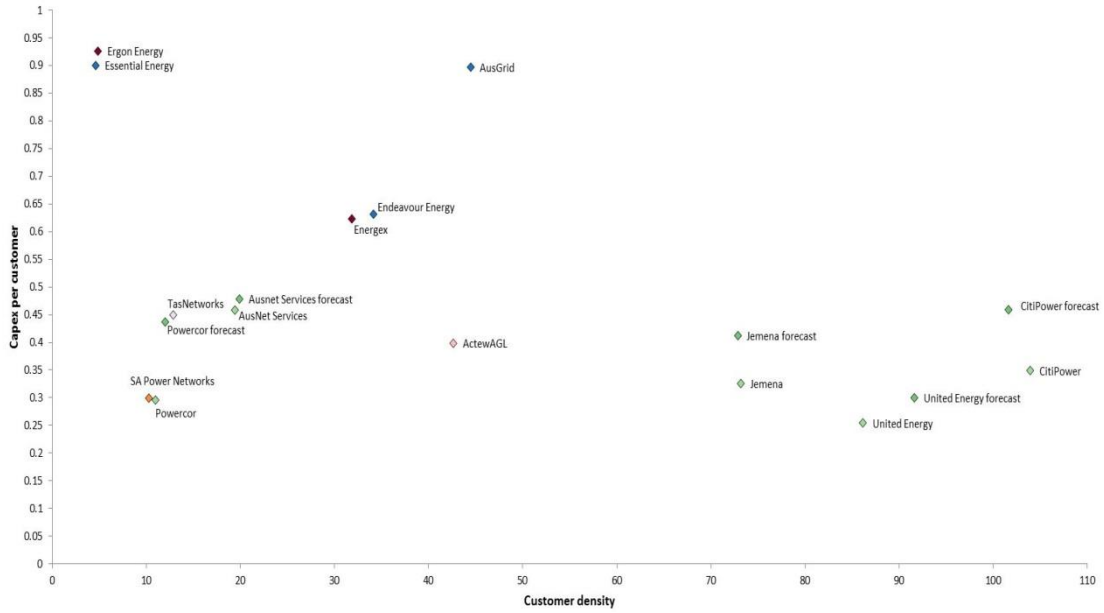
6.4.4.2 Relative capex efficiency metrics

Figure 6.4 and Figure 6.5 show capex per customer and per maximum demand, against customer density. Unless otherwise indicated as a forecast, the figures represent the five year average of each distributor's capex for the years 2008–12. We have considered capex per customer as it reflects the amount consumers are charged for additional capital investments.

Figure 6.4 and Figure 6.5 show that the Victorian distributors generally perform well in these metrics compared to other distributors in the NEM. For completeness, we also included the other Victorian distributors' proposed capex for the 2016–20 regulatory control period in the figures. However, we do not use comparisons of Jemena's total forecast capex with the total forecast capex of the other Victorian distributors as inputs to our assessment. We consider it is appropriate to compare Jemena's forecast only with actual capex. This is because actual capex are 'revealed costs' and would have occurred under the incentives of the regulatory regime.

Figure 6.4 shows that Jemena performed well in the 2008–12 period in terms of capex per customer. However, Jemena's capex per customer will increase for the 2016–20 period based on its proposed forecast capex.

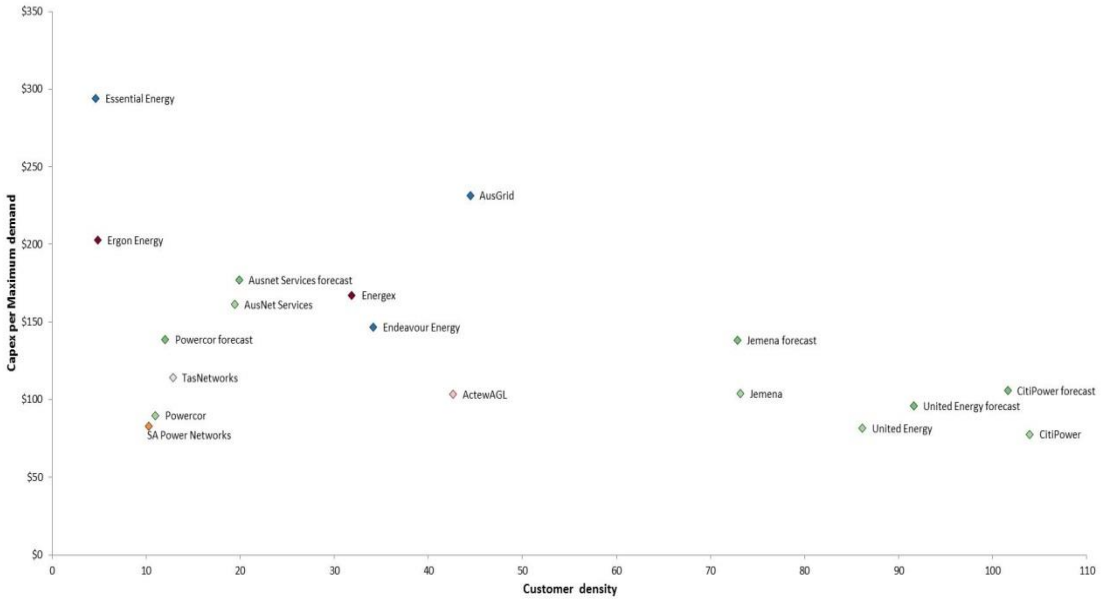
Figure 6.4 Capex per customer (000's, $2013–14), against customer density



Source: AER analysis.

Figure 6.5 shows that Jemena performed well in 2008–12 in terms of capex per maximum demand. Again capex per maximum demand is forecast to increase for Jemena in the next period.

Figure 6.5 Capex per maximum demand (000's, $2013–14), against customer density



Source: AER analysis.

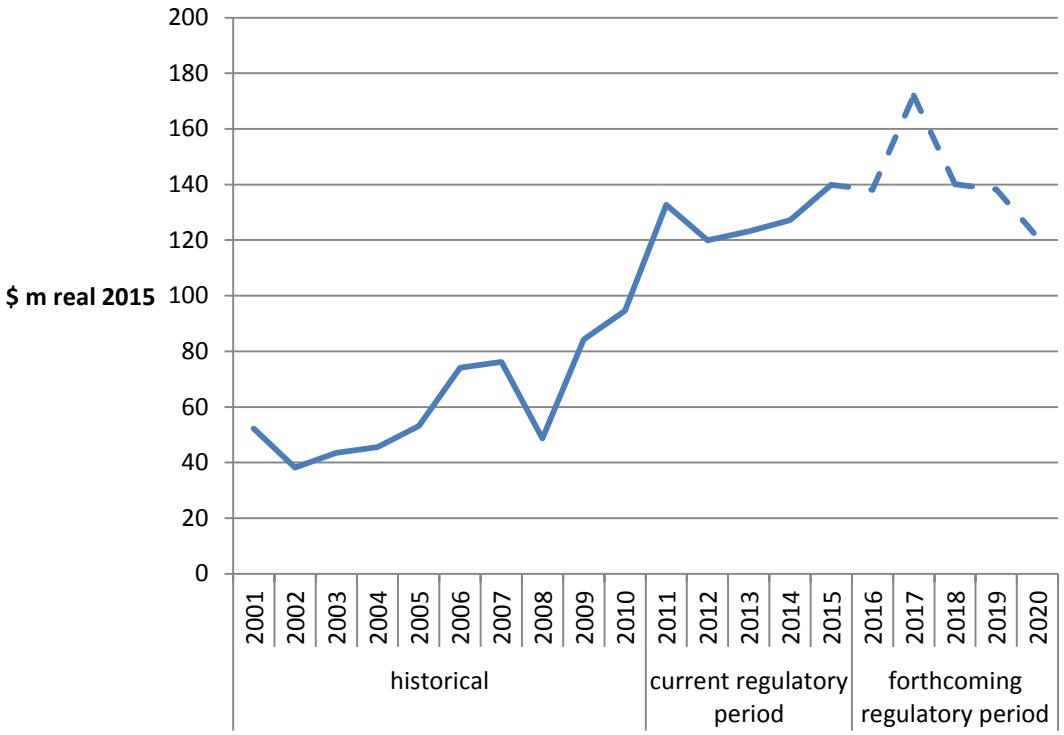
6.4.4.3 Jemena's historic capex trends

We compared Jemena's capex proposal for the 2016–20 regulatory control period against the long term historical trend in capex levels.

Figure 6.6 shows actual historic capex and proposed capex between 2001 and 2020. Jemena's forecast is significantly higher than historical levels (actual spend), particularly in 2017. We note that Jemena's capex falls towards the end of the regulatory control period.

Our detailed assessment in appendix B examines whether the increase in capex is reasonably reflective of the capex criteria.

Figure 6.6 Jemena total capex – historical and forecast for 2001–2020



Source: AER analysis.

VECCUA noted the Victorian distributors' initial capex proposals, including Jemena's, are significantly higher than historical levels.[40]

The CCP was concerned the Victorian distributors' capex in recent years has been excessive. The CCP noted capex has been reasonably constant historically and stated the total capex forecasts for the 2011–15 regulatory control period were 'aberrations'.[41]

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[40] VECUA, *Submission: AER preliminary 2016–20 revenue determinations for the Victorian DNSPs*, 6 January 2016, pp. 23–24.

The CCP further noted the Victorian distributors rejected our preliminary decisions, and as a group only marginally reduced their forecast capex from actual levels of the 2011–15 period.[42] We note Jemena's revised total capex forecast for the 2016–20 regulatory control period is approximately $66.4 million, or 10.3 per cent, higher than actual capex in the 2011–15 regulatory control period.[43] The CCP provided analysis showing the capex for the 2011–15 regulatory control period has resulted in a more expensive asset base, even when controlling for demand and customer numbers.[44]

We note Origin largely agreed with our reductions to the Victorian distributors' capex forecasts in our preliminary decisions.[45] On the other hand, VECUA stated our preliminary decisions provided excessive capex allowances to the Victorian distributors. VECUA considered the preliminary decisions predominantly based the allowances on expenditure in the 2011–15 regulatory control period.[46] VECUA noted several drivers that are putting downward pressure on the Victorian distributors' capex requirement in the 2016–20 regulatory control period, including:

- the downturn in electricity demand and consumption
- excess system capacity, declining asset utilisation and reducing network ages
- lower network reliability expectations.

Hence, VECUA stated the Victorian distributors' capex forecasts should revert to historical levels.[47]

Our detailed assessment in appendix B takes into account points made in these submissions where relevant, for example network utilisation levels and its likely impact on network augmentation requirements. In appendix B we fully examine whether Jemena's revised proposal reflects its expected operating environment.

6.4.5 Interrelationships

There are a number of interrelationships between Jemena's total forecast capex for the 2016–20 regulatory control period and other components of its distribution determination (see Table 6.4). We considered these interrelationships in coming to our final decision on total forecast capex.

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41 CCP, *Response to AER preliminary decisions and revised proposals from Victorian electricity distribution network service providers for a revenue reset for the 2016-2020 regulatory period*, 22 February 2016 p. 19.

42 CCP, *Response to AER preliminary decisions and revised proposals from Victorian electricity distribution network service providers for a revenue reset for the 2016-2020 regulatory period*, 22 February 2016 p. 19.

43 Jemena, *JEN SCS distribution capex forecast model,* January 2016.

44 CCP, *Response to AER preliminary decisions and revised proposals from Victorian electricity distribution network service providers for a revenue reset for the 2016-2020 regulatory period*, 22 February 2016 pp. 19–20.

45 Origin, *Submission: Victorian networks revised proposals*, 4 February 2016, p. 1.

46 VECUA, *Submission: AER preliminary 2016–20 revenue determinations for the Victorian DNSPs*, 6 January 2016, p. 8.

47 VECUA, *Submission: AER preliminary 2016–20 revenue determinations for the Victorian DNSPs*, 6 January 2016, p. 20.

Table 6.4 Interrelationships between total forecast capex and other components

Other component	Interrelationships with total forecast capex
Total forecast opex	There are elements of Jemena's total forecast opex that are specifically related to its total forecast capex. These include the forecast labour price growth that we included in our opex forecast in Attachment 7. This is because the price of labour affects both total forecast capex and total forecast opex. More generally, we note our total opex and capex forecast is expected to provide Jemena with sufficient opex to maintain the reliability of its network.
Forecast demand	Forecast demand is related to Jemena's total forecast capex. Specifically, augmentation capex is triggered by a need to build or upgrade a network to address changes in demand (or to comply with quality, reliability and security of supply requirements). Hence, the main driver of augmentation capex is maximum demand and its effect on network utilisation and reliability.
Capital Expenditure Sharing Scheme (CESS)	The CESS is related to Jemena's total forecast capex. In particular, the effective application of the CESS is contingent on the approved total forecast capex being efficient, and that it reasonably reflects the capex criteria. As we note in the capex criteria table below, this is because any efficiency gains or losses are measured against the approved total forecast capex. In addition, in future distribution determinations we will be required to undertake an ex post review of the efficiency and prudency of capex, with the option to exclude any inefficient capex in excess of the approved total forecast capex from Jemena's regulatory asset base. In particular, the CESS will ensure that Jemena bears at least 30 per cent of any overspend against the capex allowance. Similarly, if Jemena can fulfil their objectives without spending the full capex allowance, it will be able to retain 30 per cent of the benefit of this. In addition, if an overspend is found to be inefficient through the ex post review, Jemena risks having to bear the entire overspend.
Service Target Performance Incentive Scheme (STPIS)	The STPIS is related to Jemena's total forecast capex, in so far as it is important that it does not include any expenditure for the purposes of improving supply reliability during the 2016–20 regulatory control period. This is because such expenditure should be offset by rewards provided through the application of the STPIS. Further, the forecast capex should be sufficient to allow Jemena to maintain performance at the targets set under the STPIS. The capex allowance should not be set such that there is an expectation that it will lead to Jemena systematically under or over performing against its targets.
Contingent project	A contingent project is related to Jemena's total forecast capex. This is because an amount of expenditure that should be included as a contingent project should not be included as part of Jemena's total forecast capex for the 2016–20 regulatory control period. We did not identify any contingent projects for Jemena during the 2016–20 period.

Source: AER analysis.

6.4.6 Consideration of the capex factors

As we discussed in section 6.3, we took the capex factors into consideration when assessing Jemena's total capex forecast.[48] Table 6.5 summarises how we have taken into account the capex factors.

[48] NER, cll. 6.5.7(c), (d) and (e).

Where relevant, we also had regard to the capex factors in assessing the forecast capex associated with its underlying capex drivers such as repex, augex (see appendix B).

Table 6.5 AER consideration of the capex factors

Capex factor	AER consideration
The most recent annual benchmarking report and benchmarking capex that would be incurred by an efficient distributor over the relevant regulatory control period	We had regard to our most recent benchmarking report in assessing Jemena's proposed total forecast capex and in determining our alternative estimate for the 2016–20 regulatory control period. This can be seen in the metrics we used in our assessment of Jemena's capex performance.
The actual and expected capex of Jemena during any preceding regulatory control periods	We had regard to Jemena's actual and expected capex during the 2011–15 and preceding regulatory control periods in assessing its proposed total forecast. This can be seen in our assessment of Jemena's capex performance. It can also be seen in our assessment of the forecast capex associated with the capex drivers that underlie Jemena's total forecast capex. For some elements of non-network, augex, connections capex and repex, we rely on trend analysis to arrive at an estimate that reasonably reflects the capex criteria.
The extent to which the capex forecast includes expenditure to address concerns of electricity consumers as identified by Jemena in the course of its engagement with electricity consumers	We had regard to the extent to which Jemena's proposed total forecast capex includes expenditure to address consumer concerns that Jemena identified. Jemena has undertaken engagement with its customers and presented high level findings regarding its customer preferences in its regulatory proposal.
The relative prices of operating and capital inputs	We had regard to the relative prices of operating and capital inputs in assessing Jemena's proposed real cost escalation factors. In particular, we considered Jemena's proposed labour cost escalation.
The substitution possibilities between operating and capital expenditure	We had regard to the substitution possibilities between opex and capex. We considered whether there are more efficient and prudent trade-offs in investing more or less capital in place of ongoing operations. See our discussion about the interrelationships between Jemena's total forecast capex and total forecast opex in Table 6.4 above.
Whether the capex forecast is consistent with any incentive scheme or schemes that apply to Jemena	We had regard to whether Jemena's proposed total forecast capex is consistent with the CESS and the STPIS. See our discussion about the interrelationships between Jemena's total forecast capex and the application of the CESS and the STPIS in Table 6.4 above.
The extent to which the capex forecast is referable to arrangements with a person other than the distributor that do not reflect arm's length terms	We had regard to whether any part of Jemena's proposed total forecast capex or our alternative estimate is referable to arrangements with a person other than Jemena that do not reflect arm's length terms. We do not have any evidence to indicate that any of Jemena's arrangements do not reflect arm's length terms.
Whether the capex forecast includes an amount relating to a project that should more appropriately be included as a contingent project	We had regard to whether any amount of Jemena's proposed total forecast capex or our alternative estimate relates to a project that should more appropriately be included as a contingent project. We did not identify any such amounts that should more appropriately be included as a contingent project.

Capex factor	AER consideration
The extent to which Jemena has considered and made provision for efficient and prudent non-network alternatives	We had regard to the extent to which Jemena made provision for efficient and prudent non-network alternatives as part of our assessment. In particular, we considered this within our review of Jemena's augex proposal.
Any other factor the AER considers relevant and which the AER has notified Jemena in writing, prior to the submission of its revised regulatory proposal, is a capex factor	We did not identify any other capex factor that we consider relevant.

Source: AER analysis.

A Assessment techniques

This appendix describes the assessment approaches we applied in assessing Jemena's total forecast capex. We used a variety of techniques to determine whether the Jemena total forecast capex reasonably reflects the capex criteria. Appendix B sets out in greater detail the extent to which we relied on each of the assessment techniques.

The assessment techniques that we apply in capex are necessarily different from those we apply in the assessment of opex. This is reflective of differences in the nature of the expenditure we are assessing. As such, we use some assessment techniques in our capex assessment that are not suitable for assessing opex and vice versa. We set this out in our expenditure assessment guideline, where we stated:[49]

> Past actual expenditure may not be an appropriate starting point for capex given it is largely non-recurrent or 'lumpy', and so past expenditures or work volumes may not be indicative of future volumes. For non-recurrent expenditure, we will attempt to normalise for work volumes and examine per unit costs (including through benchmarking across distributors) when forming a view on forecast unit costs.
>
> Other drivers of capex (such as replacement expenditure and connections works) may be recurrent. For such expenditure, we will attempt to identify trends in revealed volumes and costs as an indicator of forecast requirements.

Below we set out the assessment techniques we used to asses Jemena's capex.

A.1 Economic benchmarking

Economic benchmarking is one of the key outputs of our annual benchmarking report. The NER requires us to consider the annual benchmarking report as it is one of the capex factors.[50] Economic benchmarking applies economic theory to measure the efficiency of a distributor's use of inputs to produce outputs, having regard to environmental factors.[51] It allows us to compare the performance of a distributor against its own past performance, and the performance of other distributors. Economic benchmarking helps us to assess whether a distributor's capex forecast represents efficient costs.[52] As the AEMC stated, 'benchmarking is a critical exercise in assessing the efficiency of a NSP'.[53]

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49 AER, *Better regulation: Expenditure forecast assessment guideline for electricity distribution*, November 2013, p. 8.

50 NER, cl. 6.5.7(e)(4).

51 AER, *Better regulation: Explanatory statement: Expenditure forecasting assessment guidelines*, November 2013, p. 78.

52 NER, cl. 6.5.7(c).

53 AEMC, *Final rule determination: National electricity amendment (Economic regulation of network service providers) Rule 2012*, 29 November 2012, p. 25.

A number of economic benchmarks from the annual benchmarking report are relevant to our assessment of capex. These include measures of total cost efficiency and overall capex efficiency. In general, these measures calculate a distributor's efficiency with consideration given to its inputs, outputs and its operating environment. We considered each distributor's operating environment in so far as there are factors outside of a distributor's control that affect its ability to convert inputs into outputs.[54] Once such exogenous factors are taken into account, we expect distributors to operate at similar levels of efficiency. One example of an exogenous factor we took into account is customer density. For more on how we derived these measures, see our annual benchmarking report.[55]

In addition to the measures in the annual benchmarking report, we considered how distributors performed on a number of overall capex metrics, including capex per customer, and capex per maximum demand. We calculated these economic benchmarks using actual data from the previous regulatory control period.

The results from economic benchmarking give an indication of the relative efficiency of each of the distributors, and how this has changed over time.

A.2 Trend analysis

We considered past trends in actual and forecast capex as this is one of the capex factors under the NER.[56]

Trend analysis involves comparing a distributor's forecast capex and work volumes against historical levels. Where forecast capex and volumes are materially different to historical levels, we seek to understand the reasons for these differences. In doing so, we consider the reasons the distributor provides in its revised proposal, as well as changes in the circumstances of the distributor.

In considering whether the total forecast capex reasonably reflects the capex criteria, we need to consider whether the forecast will allow the distributor to meet expected demand, and comply with relevant regulatory obligations.[57] Demand and regulatory obligations (specifically, service standards) are key drivers of capex. More onerous standards will increase capex, as will growth in maximum demand. Conversely, reduced service obligations or a decline in demand will likely cause a reduction in the amount of capex the distributor requires.

Maximum demand is a key driver of augmentation or demand driven expenditure. Augmentation often needs to occur prior to demand growth being realised. Hence, forecast rather than actual demand is relevant when a business is deciding the

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54 AEMC, *Final rule determination: National electricity amendment (Economic regulation of network service providers) Rule 2012*, 29 November 2012, p. 113. Exogenous factors could include geographic factors, customer factors, network factors and jurisdictional factors.

55 AER, *Annual benchmarking report: Electricity distribution network service providers*, November 2015.

56 NER, cl. 6.5.7(e)(5).

57 NER, cl. 6.5.7(a)(3).

augmentation projects it will require in an upcoming regulatory control period. To the extent actual demand differs from forecast, however, a business should reassess the need for the projects. Growth in a business' network will also drive connections related capex. For these reasons it is important to consider how trends in capex (in particular, augex and connections) compare with trends in demand (and customer numbers).

For service standards, there is generally a lag between when capex is undertaken (or not) and when the service improves (or declines). This is important when considering the expected impact of an increase or decrease in capex on service levels. It is also relevant to consider when service standards have changed and how this has affected the distributor's capex requirements.

We looked at trends in capex across a range of levels including at the total capex level, and the category level (such as growth related capex, and repex) as relevant. We also compared these with trends in demand and changes in service standards over time.

A.3 Category analysis

Expenditure category analysis allows us to compare expenditure across NSPs, and over time, for various levels of capex. The comparisons we perform include:

- overall costs within each category of capex
- unit costs, across a range of activities
- volumes, across a range of activities
- asset lives, across a range of asset classes which we use in assessing repex.

Using standardised reporting templates, we collected data on augex, repex, connections, non-network capex, overheads and demand forecasts for all distributors in the NEM. The use of standardised category data allows us to make direct comparisons across distributors. Standardised category data also allows us to identify and scrutinise different operating and environmental factors that affect the amount and cost of works performed by distributors, and how these factors may change over time.

A.4 Predictive modelling

Predictive modelling uses statistical analysis to determine the expected efficient costs over the regulatory control period associated with the demand for electricity services for different categories of works. We have two predictive models:

- the repex model
- the augex model (used in a qualitative sense)

The use of the repex and augex models is directly relevant to assessing whether a distributor's capex forecast reasonably reflects the capex criteria.[58] The models draw

[58] NER, cl. 6.5.7(c).

on actual capex the distributor incurred during the preceding regulatory control period. This past capex is a factor that we must take into account.[59]

The repex model is a high-level probability based model that forecasts asset replacement capex (repex) for various asset categories based on their condition (using age as a proxy), and unit costs. If we consider a distributor's proposed repex does not conform to the capex criteria, we use the repex model (in combination with other techniques where appropriate) to generate a substitute forecast.

The augex model compares utilisation thresholds with forecasts of maximum demand to identify the parts of a network segment that may require augmentation.[60] The model then uses capacity factors to calculate required augmentation, and unit costs to derive an augex forecast for the distributor over a given period.[61] In this way, the augex model accounts for the main internal drivers of augex that may differ between distributors, namely peak demand growth and its impact on asset utilisation. We can use the augex model to identify general trends in asset utilisation over time as well as to identify outliers in a distributor's augex forecast.[62]

For our final decision we have relied on input data for the augex model to review forecast utilisation of individual zone substations to assess whether augmentation may be necessary to alleviate capacity constraints. We use this analysis both as a starting point for our further detailed evaluation, and as a cross-check on our overall augex estimate. We have not otherwise used the augex model in our assessment of Jemena's augex forecast.

A.5 Engineering review

In our preliminary decision we drew on technical and other technical expertise within the AER to assist with our review of Jemena's capex proposals.[63] These involved reviewing Jemena's processes, and specific projects and programs of work.

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59 NER, cl. 6.5.7(e)(5).

60 Asset utilisation is the proportion of the asset's capability under use during peak demand conditions.

61 For more information, see: AER, *Guidance document: AER augmentation model handbook*, November 2013.

62 AER, *'Meeting summary – distributor replacement and augmentation capex', Workshop 4: Category analysis work-stream – Replacement and demand driven augmentation (Distribution)*, 8 March 2013, p. 1.

63 AER, *Better regulation: Explanatory statement: Expenditure forecast assessment guideline*, November 2013, p. 86.

B Assessment of capex drivers

We present our detailed analysis of the sub-categories of Jemena's forecast capex for the 2016–20 regulatory control period in this appendix. These sub-categories reflect the drivers of forecast capex over the 2016–20 period. These drivers are augmentation capex (augex), customer connections capex, replacement capex (repex), reliability improvement capex, capitalised overheads and non-network capex.

As we discuss in the capex attachment, we are satisfied that Jemena's proposed total forecast capex reasonably reflects the capex criteria. In this appendix we set out further analysis in support of this view. This further analysis also explains the basis for our alternative estimate of Jemena's total forecast capex that we are satisfied reasonably reflects the capex criteria. In coming to our views and our alternative estimate we applied the assessment techniques that we discuss in appendix A.

This appendix sets out our findings and views on each sub-category of capex. The structure of this appendix is:

- Section B.1: alternative estimate
- Section B.2: forecast augex
- Section B.3: forecast customer connections capex, including capital contributions
- Section B.4: forecast repex
- Section B.5: forecast capitalised overheads
- Section B.6: forecast non-network capex.

In each of these sections, we examine sub-categories of capex which we include in our alternative estimate. For each such sub-category, we explain why we are satisfied the amount of capex that we include in our alternative estimate reasonably reflects the capex criteria.

B.1 Alternative estimate

Having examined Jemena's proposal, we formed a view on our alternative estimate of the capex required to reasonably reflect the capex criteria. Our alternative estimate is based on our assessment techniques, explained in section 6.3 and appendix A. Our weighting of each of these techniques, and our response to Jemena's submissions on the weighting that should be given to particular techniques, is set out under the capex drivers in appendix B.

We are satisfied that our alternative estimate reasonably reflects the capex criteria.

B.2 Forecast augex

We accept Jemena's forecast augex of $104.6 million ($2015) for the 2016–20 regulatory control period reasonably reflects the capex criteria and will enable Jemena to achieve the capex objectives.

We also accept Jemena's proposed $27.5 million ($2015) capex for its Preston conversion project and have included it in our augex estimate. Jemena originally classified this capex as augex but added to its asset replacement capex (repex) in its revised proposal (based on our suggestion in the preliminary decision). Having assessed the revised proposal, we are of the view that the Preston redevelopment project is best categorised as augex (see section B.2.4 for more detail). While this affects the mix of augex and repex in our final decision, it does not affect the total net capex decision as it is simply a reclassification.

Table 6.6 compares forecasts across the decision making process between the initial proposal and our final decision.

Table 6.6 Jemena augex forecasts comparisons ($2015 million, excluding overheads)

	2016	2017	2018	2019	2020	Total
Initial augex forecast	18.5	48.3	40.5	23.0	10.4	140.6
AER preliminary decision	12.2	31.7	26.6	15.1	6.8	92.5
Revised Proposal	10.7	37.9	27.8	17.9	10.3	104.5
AER final forecast	16.6	44.5	37.5	23.1	10.3	132.0

Source: AER analysis.

Our reasons for accepting Jemena's revised augex proposal are set out in sections B.2.2, B.2.3 and B.2.4.

B.2.1 Jemena's revised proposal

Jemena's revised augex proposal is $104.6 million ($2015). Similar to its initial proposal, Jemena's revised proposal identifies the major projects and programs that comprise its augex forecast for the 2016-20 period.

Table 6.7 shows Jemena's augex projects and their contribution to the overall revised augex forecast.

Table 6.7 Jemena revised augex ($2015 million, excluding overheads)

Category	2016	2017	2018	2019	2020	Total
New Craigieburn zone substation	0.0	0.0	7.1	7.7	0.0	14.9
Flemington upgrade	0.4	5.1	0.0	0.0	0.0	5.5

Sunbury upgrade	0.0	5.5	8.5	0.0	0.0	14.1
HV feeders program	4.0	10.1	2.2	2.4	1.9	20.5
Distribution network program	3.8	3.5	3.5	3.5	3.6	18.0
VBRC	0.7	1.4	1.4	2.2	0.6	6.2
Other small projects	1.7	12.4	5.0	2.0	4.2	25.5
Total augex revised proposal	10.7	37.9	27.8	17.9	10.3	104.5

Source: Jemena revised regulatory proposal; Jemena response to information request #029.

Jemena's revised augex forecast is 25.7 per cent lower than its initial proposal. In developing its revised forecast, Jemena:

- revised the capex estimate for the Flemington project downwards from $8.2 million to $5.5 million
- provided additional supporting information for the Sunbury project
- re-allocated $27.5 million for its Preston network conversation project to repex and provided additional supporting information, and
- revised the capex estimate for its Melbourne Airport project and re-allocated $5.95 million capex to customer connections capex (see section B.3).

Jemena's reasoning and revised proposal is considered in detail in section B.2.4.

B.2.2 AER approach

In our preliminary decision on Jemena's augex forecast, we used a combination of top-down and bottom-up assessment techniques to estimate the efficient and prudent capex that Jemena will require to meet its obligations given expected demand growth and other augmentation drivers.[64]

First, we considered Jemena's proposed demand-driven expenditure in the context of past expenditure, demand and current utilisation of network capacity. We used our trend analysis as a starting point for our further project evaluation and as a cross-check on our overall augex estimate. On the basis of our analysis, we found that:

- Jemena's forecasts of maximum demand likely reflect a realistic expectation of demand over the 2016–20 period, and
- some of Jemena's proposed augmentation projects may be required to alleviate forecast capacity constraints, and should be considered in further detail.

Second, we undertook a more detailed economic and technical review of Jemena's network planning methodology and criteria and its major augex projects and programs.

[64] AER, *Preliminary Decision Jemena 2016-20, Attachment 6*, October 2015, pp. 37, and 38–55.

This informed our top-down review by assessing whether Jemena used processes that would derive efficient design, costs and timing for each project such that Jemena's proposed augex reflects the efficient costs that a prudent operator would require to achieve the capex objectives. In undertaking these technical reviews, we drew on engineering and other technical expertise within the AER.

Based on our technical review, we found that Jemena's network planning methodology and criteria reflects good industry practice. However, we were not satisfied that Jemena proposed a prudent and efficient option to address the need for investment for some of its major projects. Also, in a few cases Jemena adopted high-level qualitative analysis to support its proposed investments, rather than more detailed and quantitative economic analysis.

On the basis of our analysis, we formed an alternative estimate of the prudent and efficient capex for each of the augex projects and programs we reviewed. For the Sunbury, Flemington, Preston and Melbourne Airport, our estimates differed from those proposed by Jemena and we sought further information about the project analysis and justification.

We received submissions from the Victorian Energy Consumer and User Alliance (VECUA) and the Consumer Challenge Panel (CCP) on our preliminary decision and Jemena's revised proposal. These submissions are considered in this final decision.

For our final decision on Jemena's augex proposal, we adopt the same assessment approach as for our preliminary decision. The remainder of this appendix is structured as followed:

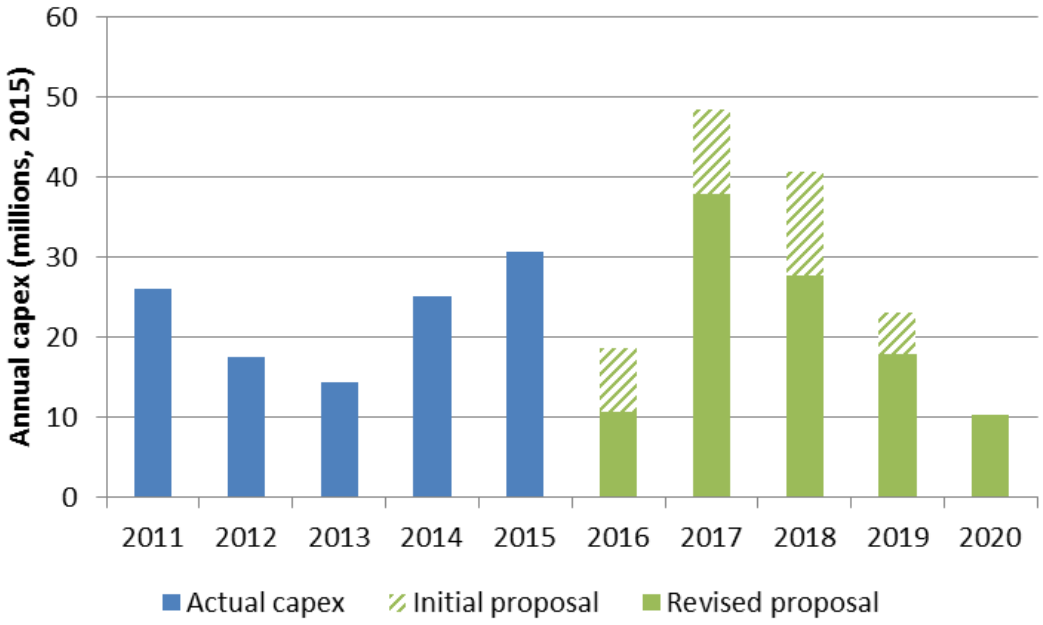
- Section B.2.3 responds to submissions on our use of trend analysis and demand forecasts
- Section B.2.4 sets out our final decision on Jemena's augex drivers and projects, including our responses to Jemena's revised proposal submission.

B.2.3 Trend and demand analysis

In our preliminary decision we examined Jemena's augex trend over time, maximum demand forecast and network utilisation. This provided us with an initial sense of whether Jemena's augex forecast is reasonably required to meet forecast demand and alleviate forecast capacity constraints. This section updates our analysis based on Jemena's revised augex and maximum demand forecasts.

Figure 6.7 shows Jemena's augex forecast compared to its actual augex over the 2011–15 period, including the changes between the initial and revised proposals. Jemena's initial augex forecast was 23 per cent higher than its actual demand-augex over the 2011–15 period. In response to our preliminary decision, Jemena reduced its proposed augex and is now 8 per cent less than its actual augex over 2011–15. However, a large proportion of this difference is due to Jemena re-allocating augex into repex and customer connections capex.

Figure 6.7 Jemena's augex historic actual and proposed for 2016–20 period ($2015, million, excluding overheads)



Source: AER analysis, Jemena's reset RIN, Jemena revised regulatory proposal.

As set out in Appendix C, Jemena is forecasting growth in maximum demand over the 2016–20 period of 1.1 per cent annum. This growth in maximum demand is the key driver of Jemena's augex forecast. In our preliminary decision, we found that Jemena's initial maximum demand forecast likely reflected a realistic expectation of demand over the 2016–20 period.[65] However, we stated that we would consider updated demand forecasts and other information (such as AEMO's 2015 updated connection point forecasts) in the final decision to reflect the most up to date data.[66]

In its revised proposal, Jemena's maximum demand forecasts are similar to the forecasts submitted in its initial proposal and are comparable to AEMO's updated maximum demand forecasts. As set out in Appendix C, we are satisfied that Jemena's revised maximum demand forecasts reflect a realistic expectation of demand over the 2016–20 period.

For our preliminary decision, we looked at network utilisation to examine the impact of maximum demand forecasts on the need for network augmentation.[67] Figure 6.8 shows Jemena's network utilisation between 2010 and 2020 (at the zone substation

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65 AER, *Preliminary Decision Jemena 2016-20, Attachment 6*, October 2015, p. 40, and Appendix C.

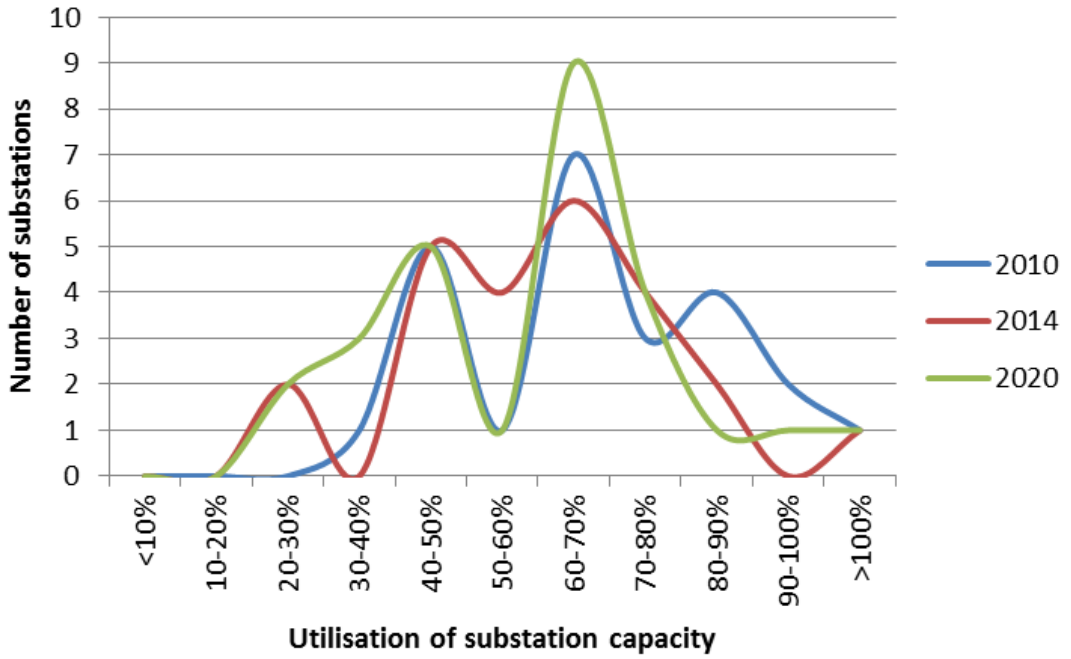
66 AER, *Preliminary Decision Jemena 2016-20, Attachment 6*, October 2015, pp. 40–41, and Appendix C.

67 Network utilisation is a measure of the installed network capacity that is in use (or is forecast to be). Where utilisation rates are shown to be declining over time (such as from a decline in maximum demand), it is expected that total augex requirements will similarly fall.

level). It shows that Jemena experienced a decline in overall network utilisation between 2010 and 2014 due to augmentation and a flattening of demand (shown by a shift to the left in network utilisation by 2014).

In contrast these years, Jemena expected that network utilization will slightly increase overall by 2020 (based on its maximum demand forecasts), with more zone substations forecast to operate above 60 per cent capacity and a projected small increase in highly utilised zone substations. Because Jemena's revised maximum demand forecasts are similar to its initial maximum demand forecasts, we have not changed our conclusions about Jemena's forecast network utilisation.

Figure 6.8 Jemena zone substation utilisation 2010 to 2020 (without augmentation)



Source: AER analysis; augex model, Jemena reset RIN.

Notes: Utilisation is the ratio of maximum demand and the thermal rating of each feeder for the specified years. Forecast utilisation in this figure is based on forecast weather corrected 50 per cent POE maximum demand at each substation and existing capacity without additional augmentation over 2015−20.

Following this high-level review of Jemena's network utilisation, we examined forecast utilisation of specific substations that Jemena proposed to augment in the 2016–20 period. On the basis of our analysis, we observed that augmentation may be prudent to ease or alleviate expected load pressures in a number of zone substations. This

approach is supported by the VECUA in its submissions to Jemena regulatory proposal and our preliminary decisions.[68]

The CCP's and VECUA's submissions to our preliminary decision and Jemena's revised proposal raise some concerns with our augex allowance (and the use of trend analysis in particular). This is discussed below.

The CCP submission examined trends in Jemena and the other Victorian DNSPs' augex over time, and reviewed AEMO's maximum demand forecasts. The key points from the CCP's submission are:[69]

- It is not convinced that the AER's augex preliminary decisions are efficient based on the long term historical data or the high level assessment of need and the low utilisation of the existing assets.
- The amount of augex in the DNSP's proposals and preliminary decisions were excessive when assessed over the longer term and trend in maximum demand. This is because the amounts of approved augex for 2016–20 exceeds the amounts actually incurred over 2001–10, a period of high demand growth, and are similar to augex incurred over 2011–15, a period of low demand growth. Recent augex overspending is the result of excessive demand forecasts.
- It considers that the only augmentation capex that is required is to strengthen the existing networks to accommodate the new developments that are forecast to be developed during the 2016–20 regulatory period. A review of AEMO's connection point demand forecasts shows that only 5 connection points forecast significant demand growth over 2016–20.

The VECUA submit that:[70]

- We have been over-reliant on bottom-up forecasting methodologies. Bottom up assessments have tendency to overstate expenditure requirements, as they do not adequately account for interrelationships/synergies between projects.
- Augex allowances should be made by utilising credible demand forecasts at the substation level, together with a detailed analysis of local capacity constraints, taking into account local system utilisation and excess capacity levels. They are unclear about the level of detail our analysis covers in respect to this issue.
- Despite acknowledging our acceptance of the unsustainable trends in DNSPs' growing excess capacity levels, we did not quantify the impact of this excess

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68 Victorian Energy Consumer and User Alliance, *Submission to the AER Victorian Distribution Networks' 2016–20 The Revenue Proposals*, 13 July 2015, p. 25.

69 Consumer Challenge Panel (sub-panel 3), *Response to AER Preliminary Decisions and revised proposals from Victorian electricity distribution network service providers for a revenue reset for the 2016-2020 regulatory period*, 25 February 2016), pp. 48–55.

70 The Victorian Energy Consumer and User Alliance (VECUA), submission to the AER on AER preliminary 2016-20 revenue determinations for the Victorian DNSPs (Developed by Hugh Grant, Executive Director, ResponseAbility), 6 January 2016, pp. 25-28, 30–34.

capacity, nor did we demonstrate that it has been appropriately considered in augex assessments.

- It is concerned about how we treated the significant reduction in asset utilisation, labelling it a “major omission” in our preliminary determinations. VECUA asserts that system utilisation is much more material to the determination of the networks’ efficient augex needs than what we have determined.

As we state in section B.2.2, we use a combination of top-down and bottom-up assessment techniques to estimate the efficient and prudent capex that Jemena will require to meet its obligations given expected demand growth and other augmentation drivers. Both of our top-down and bottom-up techniques are valuable.

In our top down techniques, we assess network utilisation and maximum demand trends to give us a helpful high-level indicator of the need for augmentation. As noted by the VECUA, Jemena's overall network utilisation decreased over 2011–15 in the presence of network investment and low demand growth (indicating there is spare network capacity). At a high level it would be reasonable to expect that forecast demand augex would fall or remain steady. However, it is important to review forecast network utilisation as this will drive the need for future augmentation. Forecast utilisation takes the existing capacity of the network and combines that with forecast demand to come up with an expected utilisation. This is shown in Figure 6.8 above, which shows that a number of specific zone substations are expected to be highly utilised by the end of the 2016─20 period.

As we note above, Jemena's demand-augex is now 8 per cent less than the augex Jemena incurred over 2011–15. However, as noted above, Jemena's augex is 23 per cent higher than its previous demand-driven augex when the Preston project is included. Therefore the results differ based on one major project, making it more difficult to draw conclusions about the trend in augex over time.

Jemena's augex forecast is driven by forecasts of maximum demand growth over the 2016–20 period. While we agree with submissions that maximum demand forecasts have been overestimated in recent periods, Jemena' maximum demand forecast for the 2016–20 period is consistent with the trend of actual maximum demand growth between 2009 and 2015, which suggests that Jemena's demand forecast is not excessive.

In some cases, our high-level assessment of demand forecasts and trends in network utilisation may be sufficient to inform our estimate of augex. However, for our preliminary and final decision, we also examined more localised network constraints and conducted economic and engineering reviews of Jemena's augex forecast. This bottom-up analysis allows us to test whether Jemena's proposed augmentation solutions are prudent and efficient (e.g. the cost and scope of the project and the consideration of non-network alternatives).

As set out in section B.2.4 below, we examined areas of the network where network utilisation is forecast to increase and augmentation (or other non-network solutions) may be required. Our analysis suggested some augex may be prudent to alleviate localised capacity constraints on the network. We also found that Jemena's network

planning methodology and criteria reflects good industry practice and the resultant augex was generally prudent and efficient.

B.2.4 Augmentation project analysis

In our preliminary decision, we examined Jemena's major augmentation projects and its network planning approach to assess whether its proposed augex reflects the efficient costs that a prudent operator would require to achieve the capex objectives.[71] At a high-level, we concluded that:[72]

- Jemena's network planning methodology and criteria reflect good industry practice because Jemena applies cost-benefit and probabilistic network planning methods to its augmentation projects that take into account AEMO's Value of Customer Reliability.
- Jemena's maximum demand forecasts that it applies to its augmentation planning were realistic (but we would consider updated demand forecasts and other information in the final decision to reflect the most up to date data).
- Jemena's options analysis was not always supported by rigorous quantitative analysis and it did not always propose a prudent and efficient option to address the need for investment.

On the basis of our analysis of our views on Jemena's options analysis, we formed an alternative estimate of prudent and efficient capex for each augex projects and programs we reviewed.[73] In particular we:

- formed an alternative estimate of Jemena's proposal to upgrade and rebuild its Sunbury zone substation
- formed an alternative estimate of Jemena's proposal to upgrade and rebuild its Flemington zone substation
- did not accept Jemena's proposed capex to upgrade its Preston network, and
- formed an alternative estimate of Jemena's proposal to upgrade its connection to Melbourne Airport.

We accepted Jemena's proposed augex for a new Craigieburn zone substation, high voltage feeders, distribution substations, capex related to the Victorian Bushfire Royal Commission (VBRC).[74] We included this capex within our overall estimate for augex.

In response to our preliminary decision, Jemena submitted revised capex and additional supporting information for its Sunbury, Flemington, Preston and Melbourne Airport projects. In addition, Jemena engaged WSP Parsons Brinckerhoff (WSPPB) to

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71 AER, *Preliminary Decision Jemena 2016-20, Attachment 6*, October 2015, pp. 43–55.
72 AER, *Preliminary Decision Jemena 2016-20, Attachment 6*, October 2015, pp. 43–44.
73 AER, *Preliminary Decision Jemena 2016-20, Attachment 6*, October 2015, pp. 44–55.
74 AER, *Preliminary Decision Jemena 2016-20, Attachment 6*, October 2015, pp. 44–55.

undertake a review of the Sunbury, Flemington and Preston conversion projects and conduct more detailed cost-benefit and options analysis.

The remainder of this section considers Jemena's revised capex for its Sunbury and Flemington zone substation projects, and Preston upgrade project.[75] As set out in more detail below, we are satisfied based on Jemena's additional information and analysis that the revised capex estimates reasonably reflect the capex criteria. We have therefore included these capex in our overall estimate for augex in our final decision.

We have not re-examined the capex we previously accepted for the new Craigieburn zone substation, high voltage feeders, distribution substations, capex related to the Victorian Bushfire Royal Commission (VBRC). Jemena accepted our preliminary decision and included this capex within its revised proposal. This capex forms part of our final estimate for Jemena's augex forecast.

Sunbury

In its original forecast Jemena proposed $14.1 million to upgrade and redevelop the Sunbury zone substation. This project is proposed to meet expected demand growth in the Sunbury-Diggers Rest growth corridor in Jemena's network.[76] The forecast included:

- $1.3 million to increase capacity with a new transformer
- $10.9 million to rebuild the Sunbury zone substation and replace existing assets, including establishing a new control building and replace the existing outdoor 22 kV switchyard with indoor 22 kV switching.[77]

In our preliminary decision, we included $1.3 million capex for a new transformer to meet expected demand growth in the Sunbury-Diggers Rest area of Jemena's network.[78] Our analysis confirmed that the Sunbury zone substation is currently over-utilised and demand is forecast to significantly exceed capacity by 2020 under normal transformer capacity.[79] This was supported by population projections from the local Hume Council which forecasts a 14 per cent increase in population between 2015 and 2020.[80] Together with the existing capacity constraints at the Sunbury substation, we concluded that there was a need for augmentation to alleviate forecast load pressure over the 2016–20 period.[81]

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75 As noted previously, Jemena has reallocated its capex for Preston and Melbourne Airport to repex and connections capex respectively. We consider the Preston project in this section and the Melbourne Airport project in the customer connections section.

76 See Jemena, *Sunbury-Diggers Rest Growth Corridor Network Development Strategy*.

77 Jemena, *Response to AER Information Request 016*, 5 August 2015.

78 AER, *Preliminary Decision Jemena 2016-20, Attachment 6*, October 2015, p. 47.

79 AER, *Preliminary Decision Jemena 2016-20, Attachment 6*, October 2015, pp. 41 and 47.

80 We obtained population growth data from the Hume Council at http://forecast.id.com.au/hume on 1 September 2015.

81 AER, *Preliminary Decision Jemena 2016-20, Attachment 6*, October 2015, p. 47.

However, we did not include the remaining $10.9 million capex to rebuild the substation as it was primarily driven by age condition of some assets and reliability concerns.[82] In particular, we highlighted that: [83]

- Unlike its augmentation assessments, Jemena did not present details of the impact on customers from further outages in terms of the value of expected unserved energy.
- Jemena did not establish that replacing these assets is necessary in the 2016–20 period to maintain network reliability, security, safety or quality to satisfy the capex objectives.
- Most of the outdoor 22 kV circuit breakers that Jemena proposed to replace were replaced in 2000 and are not reaching the end of their life.

We invited Jemena to provide further supporting information in its revised proposal including material such as business cases, options analysis and cost benefit analysis.

Jemena maintained its preferred option in its revised proposal.[84] In support of this option, Jemena submitted an enhanced cost-benefit analysis (developed by WSPPB), including a broader range of options and a quantification of the impact on customer reliability from the condition of the assets.

In its report, WSPPB agrees with our preliminary decision that "the analysis of options put forward by JEN has not established that replacing these assets is necessary to maintain network reliability, security, safety or quality to satisfy the capex objectives."[85] WSPPB also confirm that the "analysis of options put forward by JEN does not quantitatively assess the impact of asset condition and the switching arrangement on customers."[86]

To further examine Jemena's proposal, WSPPB set out a new analysis of the net present value of a full suite of options, including the option adopted in our preliminary decision (to install a new transformer). WSPPB state that the option set out in our preliminary decision was "NPV positive, and a prudent option for meeting the required capacity. However, the options analysis shows that this is not the most efficient option to relieve the capacity constraint."[87]

In addition, Jemena and the WSPPB conclude that the $1.3 million forecast we included in our preliminary decision was insufficient to alleviate the demand

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82 AER, *Preliminary Decision Jemena 2016-20, Attachment 6*, October 2015, p. 48.

83 AER, *Preliminary Decision Jemena 2016-20, Attachment 6*, October 2015, pp. 48-49.

84 Jemena, *Revised Regulatory proposal 2016–20: Attachment 07-01*, 6 January 2016, pp. 13–15.

85 Jemena, *Revised Regulatory proposal 2016–20: Attachment 7-11* (WSPPB, Independent review of Sunbury development strategy), 6 January 2016, p. 15.

86 Jemena, *Revised Regulatory proposal 2016–20: Attachment 7-11*, 6 January 2016, p. 14.

87 Jemena, *Revised Regulatory proposal 2016–20: Attachment 7-11*, 6 January 2016, p. 14.

constraint.[88] This was because we had only included only the costs of the transformer materials and installation. In total, WSPPB forecast that the total cost of the option included in our preliminary decision would be $3.0 million ($2015, direct).[89] Once these additional costs are taken into consideration, WSPPB conclude that the NPV of the option in our preliminary decision (described as option 2A in the WSPPB documentation) was $578.01 million ($2015, direct), compared to $589.06 million ($2015, direct) for the preferred option.[90]

With the assistance of technical staff within the AER we have assessed the new material submitted by Jemena, including the WSPPB report. We agree that the standalone projects costs of the option we presented in the preliminary decision are in the order of those presented by WSPPB and there is reason to depart from our preliminary decision.

Jemena has also submitted new information in response to the three core issues raised in the preliminary decision:

- details of the impact on customers from further outages — the WSPPB analysis now includes this in the net present value calculations, although we note that the impact is small[91]
- evidence that replacing these assets is necessary to maintain reliability — further evidence submitted on the asset health of the impacted circuit breakers and confirmation that their replacement is not included as part of business-as-usual repex[92]
- the outdoor 22 kV circuit breakers were replaced in 2000 — while Jemena submits that there have been ongoing reliability issues with these circuit breakers, the net present value analysis now includes an assumption that they are being replaced with two-thirds of their lives remaining.[93]

We consider that the new information submitted by Jemena adequately addresses the key points raised in our preliminary decision. Further, the range of options now presented as part of the analysis demonstrates that the preferred option does maximise the NPV. On this basis we accept Jemena's revised proposal estimate for the Sunbury project.

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88 Jemena, *Revised Regulatory proposal 2016–20: Attachment 7-12* (Addendum to the Sunbury network development strategy), 6 January 2016, p. 3.

89 Jemena, *Revised Regulatory proposal 2016–20: Attachment 7-11*, 6 January 2016, p. 14.

90 Jemena, *Revised Regulatory proposal 2016–20: Attachment 7-11*, 6 January 2016, pp. 11 and 13.

91 Jemena, *Revised Regulatory proposal 2016–20: Attachment 7-12*, 6 January 2016, p. 5.

92 Jemena, *Revised Regulatory proposal 2016–20: Attachment 7-12*, 6 January 2016, p. 6.

93 Jemena, *Revised Regulatory proposal 2016–20: Attachment 7-12*, 6 January 2016, p. 6.

Flemington

In its initial proposal, Jemena forecast $8.2 million to upgrade the Flemington zone substation. This was primarily driven by forecast capacity on the Flemington zone substation 11kV feeders and circuit-breakers, and the age of some of its assets.[94]

In our preliminary decision, we included $0.32 million as the estimate of the cost of replacing the 11 kV transformer cables which are the primary capacity constraint within the zone substation.[95] Our analysis highlighted that the Flemington zone substation was forecast to be at 73 per cent capacity by 2020. However, further information provided by Jemena noted that limited capacity on its 11kV transformers cables and circuit-breakers means that the transformers cannot be fully utilised.[96] We concluded that augmentation of existing cables alone would increase the emergency capacity of the substation from 23.9 MVA to 30.5MVA, which is sufficient to remove capacity constraints and allow the zone substation transformers to be nearly fully utilised.[97] Jemena forecast that this would cost $0.32 million in capex.

Jemena did note potential safety and security risks associated with performing excavation and civil works to augment existing cables in close vicinity to a live network. However, we considered that it was unlikely that excavation work would be required and that similar upgrades have occurred in other networks. For these reasons we considered that replacing the 11kV transformer cables with higher capacity cables was a prudent option to alleviating existing and forecast capacity constraints in the Flemington zone substation.

Jemena also initially submitted that "due to its age and condition, many of the primary assets and the protection and control assets will require replacement over the next five to ten years to maintain current levels of supply reliability."[98] In our preliminary decision we recognised that the assets in this zone substation will reach the end of their life within the next ten years. However, it was not clear that replacement was necessary in the 2016–20 period to maintain network reliability, safety or security. We invited Jemena to submit more detailed information about the existing reliability performance of these assets and quantify the costs to consumers from any expected reliability deterioration (or alternatively provide information about why this capex cannot be considered within our repex allowance if necessary).

In response to the preliminary decision, Jemena submitted an enhanced cost-benefit analysis (developed by WSPPB), including a broader range of options.[99] Based on this

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94 See Jemena, *Flemington Development Strategy*.

95 AER, Preliminary Decision Jemena 2016-20, Attachment 6, October 2015, p. 49.

96 AER, Preliminary Decision Jemena 2016-20, Attachment 6, October 2015, p. 48; Jemena, *Flemington Development Strategy*, p. iii.

97 AER, Preliminary Decision Jemena 2016-20, Attachment 6, October 2015, p. 50.

98 Jemena, *Regulatory proposal 2016–20: Attachment 07-03*, p. 73.

99 Jemena, *Revised Regulatory proposal 2016–20: Attachment 7-13* (WSPPB, Independent review of Flemington development strategy), 6 January 2016.

analysis, Jemena revised its estimated cost of the Flemington zone substation upgrade from $8.2m to $5.5 million ($2015, direct).[100] It did not entirely accept our preliminary decision. However, the revised scope of works does include using the existing cable ducts with higher rated cables, as suggested in the preliminary decision.

Jemena submit that the forecast cost we included in the preliminary decision did not allow for project on-costs.[101] When these costs were added, Jemena submit that the actual cost of the option was $0.92 million ($2015, direct).[102] When these costs are added, Jemena submit that the option does not maximise the net present value of the net market benefits.[103]

Further, Jemena and WSPPB suggest that this option alone is not sufficient to address the capacity constraint of the existing 11kV switchboards.[104] Jemena maintains that the upgrading of the existing two switchboards and the installation of a third is necessary to meet expected demand in the area.

With the assistance of technical staff within the AER we have assessed the new material submitted by Jemena. We accept that the standalone projects costs are higher than those included in our preliminary decision and there is reason to depart from our preliminary decision. We also consider that the new information submitted by Jemena on the need for the upgrade to the switchboards adequately addresses the concerns raised in our preliminary decision. On this basis we accept Jemena's revised proposal estimate for the Flemington zone substation upgrade project.

Preston conversion

Jemena proposed $27.5 million ($2015) to upgrade and convert the Preston area HV network from a voltage of 6.6kV to 22kV, and build a new Preston and East Preston zone substations on the existing zone substation land.

This project is part of a longer-term Preston area network development strategy that is proposed to span four regulatory periods at a forecast cost of $83 million.[105] Jemena submitted that in 2008 it developed a Preston area strategy which recommended converting the 6.6kV distribution assets to 22kV, rather than a like-for-like replacement of existing 6.6kV assets.[106] It stated that it had completed five of the fourteen stages of the conversion program by December 2014.

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100 Jemena, *Revised Regulatory proposal 2016–20: Attachment 07-01*, 6 January 2016, pp. 16–18.

101 Jemena, *Revised Regulatory proposal 2016–20: Attachment 07-01*, 6 January 2016, p. 16.

102 Jemena, *Revised Regulatory proposal 2016–20: Attachment 7-14* (Revised Flemington network development strategy), 6 January 2016, p. iv; Jemena, *Revised Regulatory proposal 2016–20: Attachment 07-01*, 6 January 2016, p. 16.

103 Jemena, *Revised Regulatory proposal 2016–20: Attachment 07-01*, 6 January 2016, p. 17.

104 Jemena, *Revised Regulatory proposal 2016–20: Attachment 07-01*, 6 January 2016, p. 17.

105 See Jemena, *Preston Area Network Development Strategy*, 25 January 2015.

106 Jemena, *Response to AER Information Request 044*, 3 March 2014, pp. 2–3; Jemena, *Preston Area Network Development Strategy*, 25 January 2015, pp. 30–35.

Jemena submitted that the primary drivers of this project are:[107]

- The existing distribution assets in the Preston and East Preston areas and surrounding 6.6kV feeder network are approaching the end of life and require replacement. This is the primary driver.
- Poor asset condition of these assets (as indicated by Jemena's health indicators) means that there is an increased risk of outages.
- There is insufficient feeder capacity in the Preston and Preston East 6.6kV area for single contingencies (i.e. feeder load exceeding n-1 rating).
- Demand at the adjacent Coburg South zone substation exceeds n-1 emergency capacity rating. This zone substation is currently receiving load transfers from the Preston zone substation as Jemena has begun performing its conversion works.

Jemena included this capex in its original augex proposal for the 2016-20 period. We did not include Jemena's forecast for this project in our preliminary decision. Based on Jemena's documentation, we did not consider that the primary driver of the project was the need to expand the capacity or capability of the network. We therefore concluded that Jemena had not appropriately justified the need for the expenditure on the basis of an augmentation driver and did not include it within our augex forecast.[108]

We invited Jemena to provide:[109]

- information to support the project's inclusion in our repex forecast, including updating any historical and forecast expenditure, business cases, options analysis and cost benefit analysis
- further justification of the timing of the project, including reference to the reliability performance of the assets, rather than just the age profile and physical condition of the assets
- analysis of the potential for non-network options or the transferring of load to the new East Preston zone substation (which has three new 22kV feeders that are available to pick up load).

In its revised proposal, Jemena:

- removed the project from its augex forecast and included it in its repex forecast, including a portion of it forecast through the repex model, supported by updated historical and forecast data (including in response to further information requests)
- engaged consultant WSPPB to undertake a review of the Preston conversion project and conduct more detailed cost-benefit and options analysis[110]

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107 Jemena, *Revised Regulatory proposal 2016–20: Attachment 07-01*, 6 January 2016, pp. 18–19.

108 AER, *Preliminary Decision Jemena 2016-20, Attachment 6*, October 2015, p. 53.

109 AER, *Preliminary Decision Jemena 2016-20, Attachment 6*, October 2015, p. 54.

110 Jemena, *Revised Regulatory proposal 2016–20: Attachment 7-15* (WSPPB, Independent review of Preston development strategy), 6 January 2016.

Both Jemena and WSPPB agree with our preliminary decision that the key driver for this project is the condition of the 6.6kV assets, with capacity constraints being a secondary driver.[111] However, Jemena submit that a like-for-like replacement of the 6.6kV assets is not the most efficient option over the life cycle. Supported by WSPPB modelling, Jemena submit that the net present value of the cost to consumers is minimised if the 6.6kV assets are converted to 22kV using standard design substations. This is referred to in the Jemena documentation as 'option 3'.[112]

Importantly, the WSPPB report presents a cost benefit assessment of the relevant options by analysing the cost of unserved energy related to the forecast reliability of the assets.[113] In our preliminary decision, we raised concerns regarding the lack of this analysis in the original proposal. In general terms, where the net present value of the cost of a project is smaller than the net present value of the unserved energy, the project is justified. The timing of a particular project is said to be optimal when the difference between the cost and benefit of the project is maximised.

With the assistance of technical staff within the AER we have assessed the new material submitted by Jemena, including the cost benefit analysis now undertaken by WSPPB. We considered that the new information submitted by Jemena addresses the key points raised in our preliminary decision, and the range of options now presented as part of the analysis demonstrates that the preferred option does maximise the NPV However, we examined the assumptions that underpinned the unserved energy analysis to test the robustness of the conclusions.[114]

We found that the asset failure rate assumptions tended to overstate the value of unserved energy. For example, we could find little evidence to support the modelling assumption of a 1 in 30 chance of major failure of a busbar in Preston zone substation. We note that for this assumption to hold, there would have been 1.87 major bus failure events resulting in loss of entire substation load the past 7 years. We could not find evidence of this failure rate.

However, even after correcting for these likely over-estimates, we found that the ranking of projects in the analysis did not change. Specifically we found that all elements of the project due to be completed in the 2016-2020 period were justified and that delaying any element returned a slightly worse net present value outcome. Accordingly, we have included Jemena's forecast for the Preston conversion project in our capex estimate.

As noted above, Jemena's revised proposal includes this capex in its repex forecast. Having assessed the revised proposal, we are of the view that the Preston

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111 Jemena, *Revised Regulatory proposal 2016–20: Attachment 7-15*, 6 January 2016, p. 12.

112 Jemena, *Revised Regulatory proposal 2016–20: Attachment 7-14* (Addendum to the Preston development strategy), 6 January 2016, p. 3.

113 Jemena, *Revised Regulatory proposal 2016–20: Attachment 7-15*, 6 January 2016, pp. 8–12.

114 Jemena provided with us with its economic model for the Preston project in response an information request. See Jemena, *Response to AER Information Request 035,* 15 February 2016.

redevelopment project is best categorised as augex. This is because repex involves the replacement of an asset that no longer meets its service requirement with its modern equivalent (i.e. like-for-like replacement). The Preston redevelopment, which involves the upgrade to the capacity and functionality of various network assets, is not like-for-like replacement. It is important for comparative assessment purposes (both across service providers and for future regulatory determinations involving Jemena) that the augex and repex are appropriately categorised for the types of investments made. While this affects the mix of augex and repex in our final decision, it does not affect the total net capex decision, as it is simply a reclassification.

B.3 Forecast customer connections capex, including capital contributions

Connections capex is incurred by Jemena to connect new customers to its network and where necessary augment the shared network to ensure there is sufficient capacity to meet the new demand.

New connection works can be undertaken by Jemena or a third party. The new customer may be required to provide a contribution towards the cost of the new connection assets. This contribution can be monetary or in contributed assets. In calculating the customer contributions, Jemena is required to take into account the forecast revenue anticipated from the new connection. These contributions are subtracted from total gross capex and as such decrease the revenue that is recoverable from all consumers. Customer contributions are sometimes referred to as capital contributions or capcons.

The mix between net capex and capcons is important as it determines from whom and when Jemena recovers revenue associated with the capex investment. For works involving a customer contribution, Jemena recovers revenue directly from the customer who initiates the work at the time the work is undertaken. This is different from net capex where Jemena recovers revenue for this expenditure through both the return on capital and return of capital building blocks that form part of the calculation of Jemena's annual revenue requirement. That is, Jemena recovers net capex investment across the life of the asset through revenue received for the provision of standard control services.

B.3.1 AER Position

We are satisfied that Jemena's revised proposal for connections capex of $172.1 million amount reasonably reflects the capex criteria.[115] As such, we have included the amount shown in Table 6.8 in our substitute estimate of forecast capex. Further, we accept Jemena's revised proposal for customer contributions of $153.2 million ($2015).

Table 6.8 AER final decision connections capex ($2015) million excluding overheads)

	2016	2017	2018	2019	2020	Total
Connections capex	33.2	41.6	31.9	32.5	32.8	172.1
Customer contributions	29.7	31.9	29.2	30.3	32.2	153.2

Source: AER analysis.

[115] NER, cl. 6.5.7(c).

Similar to our preliminary decision, in determining our position we considered:

- Jemena's forecast methodology
- the trends in Jemena's connections capex across time.

Jemena's revised proposal largely accepts our preliminary decision, which sets out our assessment of the gross connection capex and customer contributions we consider Jemena will be required to undertake to meet the capex objectives over the 2016–20 regulatory control period.[116]

Jemena's revised proposal represents an increase in both gross connections capex and customer contributions to the amounts that we included in our preliminary determination. Below we discuss the reasons for the variation between our final decision and our preliminary decision.

Gross connections capex

Our preliminary decision accepted Jemena's proposed gross connection capex. We did however consider a key customer project included in Jemena's forecast connections capex, the Melbourne airport expansion, was better characterised as augmentation. We therefore included an amount for this in our substitute capex forecast as augex.[117]

In its revised proposal Jemena accepted our preliminary decision for gross connections capex.[118] Jemena's has reassessed the needs of the Melbourne Airport precinct project and its revised proposal updates its capex forecast to reflect new information and Jemena has re-categorised this expenditure as connections capex.[119] Further, Jemena's revised proposal has forecast funding for the Melbourne Airport precinct project will come through an upfront customer contribution and future customer-specific tariffs.[120]

We have assessed Jemena's supporting material regarding the Melbourne Airport expansion and we are satisfied that Jemena has demonstrated this is properly categorised as connections capex and reasonably reflects the capex criteria.[121]

In determining this, we are satisfied that:

- Based on Jemena's supporting material there is a demonstrated network constraint due to the expansion of Melbourne Airport. That is, the projected load growth at

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116 NER, cl. 6.5.7(a).

117 Our preliminary decision only included an amount of $5.95 million ($2015) of the $14.5 million ($2015) Jemena proposed. This was because although we were satisfied Jemena had justified the need augment the existing 66kV sub-transmission loop it did not need to install a new 66kV sub-transmission line to the Melbourne Airport which was the other part of the proposed expenditure.

118 Jemena, *Revised regulatory proposal, Attachment 7-1 Capital Expenditure*, January 2016, p. 21.

119 Jemena, *Revised regulatory proposal, Attachment 7-1 Capital Expenditure*, January 2016, p. 21.

120 Jemena, *Revised regulatory proposal, Attachment 7-1 Capital Expenditure*, January 2016, p. 25.

121 NER, cl. 6.5.7(c).

Melbourne Airport exceeds the current sub-transmission loop capacity. We consider it a realistic expectation that the network may become overloaded in certain N-1 scenarios, with risk of unserved energy outweighing the annual capital cost.

- The proposed network solution represents connections capex and is a prudent approach that reflects the efficient costs to manage the expected demand. Further the solution offers potential future benefits to the airport and other Jemena customers. In particular, we are satisfied that the solution provides the lowest cost solution in the long term interests of consumers. It also reduces the risk of future asset stranding and allows flexibility for future capacity increase.

With this in mind we have included an amount of $12.3 million ($2015), as proposed by Jemena, for the Melbourne Airport expansion in our substitute estimate of capex as connections capex. This means that we include Jemena's total gross connections capex forecast in our substitute estimate.

Customer contributions

When a new customer connects to the network, it may be required to provide a contribution towards the cost of the connection assets. This contribution can be monetary or contributed (gifted assets).

Our preliminary decision sets out the reasons why we are satisfied that the customer contributions forecast by Jemena reasonably reflect the contributions it is likely to receive in the 2016–20 regulatory control period.[122] As such, our preliminary decision included an amount of $102.7 million ($2015) for customer contributions.

In its revised proposal Jemena has proposed a higher amount of $153.2 million ($2015) in its customer contributions capex forecast. [123] Jemena in its revised proposal notes:

- The preliminary decision did not include $29.9m (including capitalised overheads) of customer contributions associated with special capital works relating to relocating assets which was categorised as repex.
- It has updated the customer mix in its revised proposal on the basis of updating its customer number forecasts. This updated forecast customer number forecast produces a lower forecast connections forecast for business supply>10kVA and higher forecast connections for medium density housing and dual and multiple occupancy.[124]
- the revised forecast relating to the Melbourne Airport precinct project as connections capex that was previously augex

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122 AER, *Jemena Preliminary Decision 2016-20 Attachment 6 Capital Expenditure*, p. 6-56.

123 Jemena, *Revised regulatory proposal (Submission on revocation)*, January 2016, p. 22.

124 Jemena, *Revised regulatory proposal (Submission on revocation)*, January 2016, p. 22.

- changes in customer contributions arising from the transition from Guideline 14 to NER chapter 5A.

We have assessed the material supporting Jemena's updated customer contribution forecasts and we are satisfied that the forecast reflects a realistic expectation of the customer contributions Jemena will receive over the 2016–20 regulatory control period.[125] We examined each of the above changes to its proposal in turn.

First, we are satisfied that the amount associated with special capital works Jemena has included in Jemena's revised proposal should be included in our forecast of customer contributions. Having regard to the service classification sets out in the framework and approach, we are satisfied that the work is customer initiated and involves the rearrangement of distribution assets serving that customer. As such, it attracts a customer contribution under both ESCV Guideline 14 and chapter 5A of the NER.[126]

Given the nature of the work, Jemena included this expenditure in its gross repex forecast. As we note in our repex assessment in the below section, we have included the gross capex associated with this work in our substitute estimate and as such we have also included this amount in our final decision forecast customer contributions.[127]

Second, consistent with the reasons set out in our preliminary determination, we are satisfied Jemena's forecast methodology produces a forecast that reflects a realistic expectation of the connection activity over the 2016–20 regulatory control period.[128] As noted above, Jemena has updated its forecast based on updated customer number forecasts. In its revised proposal it forecast continued changes in customer mix during the 2016–20 regulatory control period. These changes are characterised by declines in large industrial customers offset by significant growth in residential and commercial customers.[129]

We are satisfied it is reasonable to have regard to the latest volume of connection activity in determining forecast customer numbers. As such, we are satisfied that it is reasonable for Jemena to update its forecast to reflect the latest available information. We are satisfied that Jemena's residential customer numbers are likely to grow at a higher rate than was forecast in its initial proposal. We note that, for the purpose of forecasting output growth for opex, we have forecast a lower rate of residential customer number growth than Jemena did in its revised regulatory proposal. However, we are satisfied for the purpose of forecasting Jemena's customer contributions that this difference will not have a material impact. As such we have included Jemena's forecast customer contributions in our alternative estimate.

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125 NER, cl. 6.5.7.

126 AER, *Final Framework and Approach for the Victorian Electricity Distributors*, p. 145.

127 AER, *Jemena Final Decision 2016-20 Attachment 6 Capital Expenditure*, p. 6-57

128 AER, *Jemena Preliminary Decision 2016-20 Attachment 6 Capital Expenditure,* p. 6-56.

129 Jemena, *Revised regulatory proposal (Submission on revocation)*, January 2016, p. 22.

Third, with respect to the Melbourne Airport expansion project, Jemena's revised proposal relied on obtaining new information from the operator, Australia Pacific Airports Melbourne (APAM). With recent feasibility assessments, Jemena has forecast that project will be recovered through upfront customer contributions.[130] For the reasons discussed above we are satisfied that Jemena's capex proposed associated with the Melbourne Airport expansion reflects the capex criteria. Further we are satisfied that this will be recovered through a customer contribution.

Further, in its revised proposal Jemena notes:

> …the Victorian Government has announced its proposed partial implementation of NER chapter 5A for the economic regulation of connecting customers, moving away from the ESC's guideline 14 standard. The Bill that gives effect to the adoption of Chapter 5A was introduced to parliament on 8 December 2015—the National Electricity (Victoria) Further Amendment Bill 2015. The Department of Economic Development, Jobs, Transport and Resources have advised us that the Bill will reach assent by March 2016. The Bill provides for the implementation of Chapter 5A and Chapter 6 Part DA of the NER. These sections deal with the preparation of, requirements for, and approval of, connection policies to commence from a date yet to be proclaimed in 2016 but no later than 1 January 2017. The Bill also provides for new energy regulations to replace current Victorian regulatory arrangements on tendering policies on connection works and embedded generators and matters relating to undergrounding for distribution assets. To reflect the new NER 5A provisions, we have provided an updated customer contribution forecast.[131]

CCP3 considers that although there is forecast legislative change to alter the capital contribution assessment process, the basis of the calculations should continue on current rules (ESCV guidelines) until the change comes into effect and there should be a pass through change triggered to reflect the difference in approach.[132] Further CCP3 notes that the different DNSPs have different outcomes, in percentage terms for the amount of capex recovered from customer. This implies that they have differing approaches to calculating the customer contributions despite them apparently applying the same guideline. Further, CCP3 is concerned that the different DNSPs all have significantly different outcomes (in percentage terms) for the amount of capex recovered from customer, implying that they have differing approaches to calculating the customer contributions despite them apparently applying the same guideline.

Consistent with our preliminary decision, we are satisfied that Jemena's updated customer contribution forecast is still consistent with its forecasting approach included in its initial proposal. We note that in response Jemena's stated:

> JEN's methodology for calculating the uplift is compliant with both Guideline 14 and the AER connection charge guideline. AER connection charge guideline clause 5.3.5 requires JEN to use the price path until the end of the determination (2016–20) and a flat price path after the end of the

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130 Jemena, *Revised regulatory proposal (Submission on revocation)*, January 2016, p. 25.

131 Jemena, *Revised regulatory proposal (Submission on revocation)*, January 2016, p. 25.

132 CCP3, *Report on AER Preliminary Decisions and DNSPs' Revised Proposals from Victorian electricity distribution network service providers for a revenue reset for the 2016-2020 regulatory period*, 25 February 2016, p. 55.

> determination. Guideline 14 requires JEN to use the last year's X-factor after the end of the determination. As JEN proposes zero price increase in the final year of the determination, the proposed methodology is compliant with the requirements of both Guidelines.

In determining this, we compared the ESC Guideline 14 with the AER's Connection charge guidelines. We note that both these guidelines prescribe similar methods for calculating customer contributions. In simple terms, both guidelines calculate the contribution as the difference between the cost to the distributor of connecting the customer to the distribution network and the revenue the distributor will receive from that connection. Therefore we consider any differences between the two guidelines must relate to the assumed future incremental revenue or the assumed incremental cost for each forecast connection.

Incremental revenue

Both the ESC and AER guidelines rely on assumptions on the revenue that the distributors will receive for each connection. Under ESC guideline 14 the calculation of the revenue the distributor will earn from each connection relies on assuming that the price path for the last year of the price determination continues over the 30 years for domestic customers and 15 years for all other customers.[133] The AER's connection policy uses a flat real price path after the end of the relevant distribution determination, for the remaining life of the connection, when estimating the incremental revenue.[134]

Incremental cost

Similar to incremental revenue discussed above, both the ESC and AER guidelines rely on assumptions on the costs of the connection requiring a customer contribution. These costs, or incremental costs, represent the expenditure that the distributors will incur as part of the connection. We view the method to calculate the incremental cost of connections to be similar under both guidelines. That is both factor in the impact the connection has on the network and downstream augmentation in determining incremental cost. We do consider a difference exists between the two guidelines regarding the treatment of operating, maintenance and other costs. That is the ESC Guideline 14 includes opex in its calculation of incremental cost whereas the AER's connection policy does not include these costs.

We consider that accounting for the differences between the ESC Guideline 14 and the AER connection policy would be immaterial to the forecast of customer contributions. Further, we consider it is likely that Chapter 5A will be adopted in Victoria over the course of the 2016–20 regulatory control period under the AER's Connection Charge Guideline under Chapter 5A of the NER. On this basis, we are satisfied that Jemena's forecast reflects a realistic expectation of customer contributions it will receive over the 2016–20 regulatory control period.

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[133] Essential Services Commission, Guideline No. 14 Provision of Services by Electricity Distributors.

[134] AER, Connection charge guidelines for electricity retail customers Under chapter 5A of the National Electricity Rules.

B.4 Forecast repex

Replacement capital expenditure (repex) must be set at a level that allows a distributor to meet the capex criteria.

Replacement can occur for a variety of reasons, including when:

- an asset fails while in service, or presents a real risk of imminent failure
- a condition assessment of the asset[135] determines that it is likely to fail soon (or degrade in performance, such that it does not meet its service requirement) and replacement is the most economic option
- the asset does not meet the relevant jurisdictional safety regulations, and can no longer be safely operated on the network
- the risk of using the asset exceeds the benefit of continuing to operate it on the network.

The majority of network assets will remain in efficient use for far longer than a single five year regulatory control period (many network assets have economic lives of 50 years or more). As a consequence, a distributor will only need to replace a portion of its network assets in each regulatory control period. Our assessment of repex seeks to establish the portion of Jemena's assets that will likely require replacement over the 2016–20 regulatory control period and the associated capital expenditure.

Our assessment of repex seeks to establish the portion of Jemena's assets that will likely require replacement over the 2016–20 regulatory control period, and the associated expenditure.

B.4.1 Position

We are satisfied that Jemena's proposed repex of $228.1 million (not including the Preston Conversion project), excluding overheads, reasonably reflects the capex criteria. We have assessed Jemena's proposed capex for the Preston Conversion project as augex in appendix B.7. Table 6.9 summarises Jemena's proposals and our alternative amounts for repex at each stage of the assessment period.

[135] A condition assessment may relate to assessment of a single asset or a population of similar assets. High value/low volume assets are more likely to be monitored on an individual basis, while low value/high volume assets are more likely to be considered from an asset category wide perspective.

Table 6.9 Final decision on Jemena's total forecast repex ($2015, million)

	2016	2017	2018	2019	2020	Total
Initial regulatory proposal	36	41	39	53	54	224
AER preliminary decision	36	41	39	53	54	224
Revised regulatory proposal	43	48	50	59	55	256[(a)]
AER final decision	37	42	41	54	55	228
Total difference b/w final and revised	-6	-7	-10	-5	0	-28
Percentage difference b/w final and revised (%)	-14	-14	-20	-9	0	-11

Source: AER analysis.

Note: Numbers may not add up due to rounding.

(a) Jemena proposed an amount of $256 million for repex in its revised proposal. This is higher than its initial proposal as Jemena reclassified proposed expenditure for its Preston Conversion project from augex to repex. We have considered the Preston Conversion project in our assessment of augex rather than repex. In addition, Jemena proposed an additional $4.6 million in its revised proposal. This additional amount predominately reflects an amount for special capital works and recoverable works. We have accepted this additional amount given we have accepted Jemena's customer connection forecasts (refer to section B. 8).

B.4.2 Jemena's revised proposal

Jemena accepted our preliminary decision of $224 million. Jemena's revised proposal for repex is $256 million which mainly reflects Jemena's reclassification of the Preston Conversion project from augex to repex.[136]

B.4.3 AER approach

We have applied several assessment techniques consistent with our preliminary decision to assess Jemena's forecast of repex against the capex criteria. These techniques include:

- analysis of Jemena's long term total repex trends
- consideration of relevant supporting material such as business cases
- predictive modelling of repex based on Jemena's assets in commission; and
- consideration of various asset health indicators.

[136] Jemena revised proposal, January 2016, pp. 41–42.

We have primarily used our predictive modelling to assess approximately 50 per cent of Jemena's proposed repex. For those aspects of our assessment where we have not used predictive modelling, we have relied on the assessment of expenditure trends, the consideration of asset health indicators, and assessment of supporting material such as business cases to assess Jemena's revised proposal. Our findings from these assessment techniques are consistent with our overall conclusion.

Trend analysis

We have used trend analysis (historical expenditure) to draw general observations from historical expenditure trends in relation to repex.[137] We recognise the limitations of expenditure trends, especially in circumstances where replacement needs may change over time (e.g. a distributor may have a lumpy asset age profile or legislative obligations may change over time). However, for some aspects of our assessment where we have not relied on predictive modelling, we have used historical levels of expenditure to reject Jemena's forecast of repex or to determine our alternative estimate. In particular, where past expenditure was sufficient to meet the capex criteria, we are satisfied that it can be a reasonable indicator of whether forecast repex is likely to reflect the capex criteria.[138]

Predictive modelling

Our predictive model, known as the 'repex model', can predict a reasonable amount of repex Jemena would require if it maintains its current risk profile for condition-based replacement into the next regulatory control period. Using what we refer to as calibrated replacement lives in the repex model gives an estimate that reflects Jemena's 'business as usual' asset replacement practices. The rationale for using calibrated replacement lives is detailed in our preliminary decision.

As part of the 'Better Regulation' process we undertook extensive consultation with service providers on the repex model and its inputs. The repex model we developed through this consultation process is well-established and was implemented in a number of revenue determination processes including the recent NSW/ACT and QLD/SA decisions. This assessment technique builds on repex modelling we undertook in previous Victorian and Tasmanian distribution pricing determinations.[139]

The repex model has the advantage of providing both a bottom up assessment, as it is based on detailed sub-categories of assets using data provided by the service providers, and once aggregated it provides a well-founded high level assessment using that data. The model can also be calibrated using data on Jemena's entire stock of

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137 NER, cl. 6.5.7(e)(5).

138 AER, Expenditure Forecast Assessment Guideline for Electricity Distribution, November 2013, pp. 7–9.

139 We first used the predictive model to inform our assessment of the Victorian distributors' repex proposals in 2010. We undertook extensive consultation on this technique in developing the Expenditure Forecasting Assessment Guideline. We have since used the repex model to inform our assessment of repex proposals for Tasmanian, NSW, ACT, QLD and SA distributors.

network assets, along with Jemena's recent actual replacement practices, to estimate the repex required to maintain its current risk profile.

We recognise that predictive modelling cannot perfectly predict Jemena's necessary replacement volumes and expenditure over the next regulatory control period, in the same way that no prediction of future needs will be absolutely precise. However, we consider the repex model is suitable for providing a reasonable statistical estimate of replacement volumes and expenditure for certain types of assets, where we are satisfied we have the necessary data. We explain our reasons for this in Appendix F of our preliminary decision. We also note that the service providers (including Jemena) rely on similar predictive modelling to support their forecast amount for repex.

We use predictive modelling to estimate a value of 'business as usual' repex for the modelled expenditure categories to assist in our assessment. Any material difference from the 'business as usual' estimate could be explained by evidence of a non-age related increase in asset risk in the network (such as a change in jurisdictional safety or environmental legislation) or evidence of significant asset degradation that could not be explained by asset age. We use our qualitative techniques to assess whether there is any such evidence. In this way, we consider that the repex model serves as a 'first pass' test, as set out in our Expenditure Guideline.[140]

We recognise there are reasons why some assets may be better assessed outside of the repex model. Where we considered it was justified, we separately assessed expenditure for such assets outside the model using techniques other than predictive modelling.

Network health indicators

We have used a number of asset health indicators with a view to observing asset health. Asset utilisation is one such indicator. We have had regard to changes in asset utilisation to provide an indication as to whether Jemena's assets are likely to deteriorate more or less than would be expected given the age of its assets. Asset utilisation in some circumstances is a useful check on the outcomes of our predictive modelling in that unlike the other indicators, and the predictive modelling itself, it is not age based.

The remaining indicators we have used are aged based. We acknowledge that these are less useful for providing a check on the outcomes of our predictive modelling because the model also assumes age is a reasonable proxy for asset condition. While providing some context for our decision, we have not relied on these age-based indicators to any extent to inform our alternative estimate. However, these indicators have provided context for our decision and the findings are consistent with our overall conclusion.

[140] AER, *Expenditure Forecast Assessment Guideline for Electricity Distribution*, November 2013, p. 11.

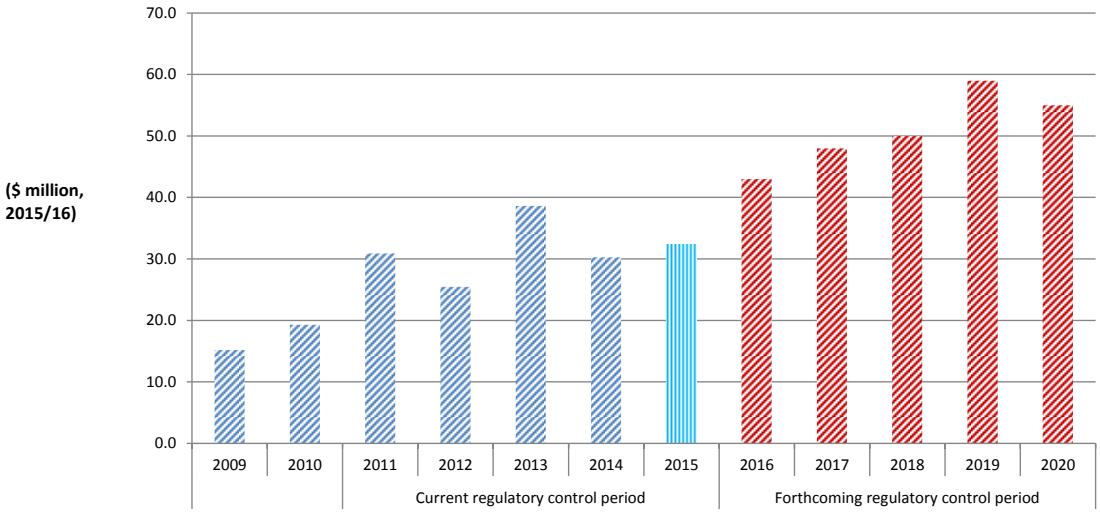
B.4.4 AER repex findings

Trends in historical and forecast repex

We have conducted a trend analysis of repex. The NER requires that we consider the actual and expected capital expenditure during any preceding regulatory control period.[141] Our use of trend analysis is to gauge how Jemena's historical actual repex compares to its expected repex for the 2016–20 regulatory control period.

Figure 6.9 shows Jemena's repex spend has been variable across time, and is forecast to increase above historical levels for the 2016–20 regulatory control period.

Figure 6.9 Jemena- Actual and forecast repex ($ million, 2015)



Source: Category analysis and Reset RINs

Note: Jemena's forecast repex includes the Preston upgrade project.

When considering the above trend we acknowledge there are limitations in long term year on year comparisons of replacement expenditure. In particular we are mindful that during the 2011–15 regulatory control period, Jemena says that it overspent its regulatory allowance for reliability and quality maintained capex which it associates as primarily related asset replacement capex.[142] We note that a major feature of the regulatory framework is the incentives Jemena has to achieve efficiency gains whereby actual expenditure is lower than the allowance. Differences between actual and allowed repex could be the result of efficiency gains, forecasting errors or some

[141] NER, cl. 6.5.7(e)(5).

[142] Jemena, *Regulatory Proposal 2016–20: Attachment 07-01 Historical capital expenditure report for the 2011 regulatory period*, April, 2015, p. 5.

combination of the two. Jemena noted that this overspend was a result of higher unit costs than was provided in its allowance for the following projects and programs:

- non-preferred service replacement
- pole reinforcement; and
- pole replacement.

Further Jemena overspent on capex projects related to the Yarraville zone substation decommissioning. This was a result of higher than forecast urban infill meaning it was prudent to rebuild the existing substation rather than shift load onto surrounding substations as was provided for in the 2011–15 regulatory control period allowance.

In terms of overall capex, Jemena noted in its proposal that:

> We also experienced slightly lower peak demand relative to our forecast, which contributed to our decision to defer some demand-driven projects, and also meant we could replace a greater volume of the failure-prone and oldest assets in our network in the 2011 regulatory period.[143]

We have been mindful of the above trends and the reasons Jemena has provided in assessing the repex allowance required for the 2016–20 regulatory control period.

An increasing or decreasing trend does not, in and of itself, indicate that proposed repex that is or is not likely to reasonably reflect the capex criteria. In the case of Jemena, which has proposed an increase in repex from the last regulatory control period, we must consider whether the increased amount reasonably reflects the capex criteria. We use our predictive modelling, the advice of our consultants, the views of stakeholders, the material put forward by Jemena's in support of its forecast, and our consideration of any repex required to meet the new safety obligations arising from the recommendations of the VBRC, to form a view on whether Jemena has sufficiently justified its increase in proposed repex from the last regulatory control period.

The CCP was concerned that the amount of repex sought in the revised proposals was only marginally lower than that initially sought. The CCP noted actual repex in the 2011–15 period was far greater than the previous 2006–10 period. It considered longer term trends in repex show that historic, lower, levels of repex maintained the Victorian distributor's reliability levels. CCP questioned why higher levels of repex are required now to provide the same level of reliability sought by consumers.[144] The Victorian Energy Consumer and User Alliance (VECUA) also submitted it was concerned with repex increasing significantly from the 2006–10 period to now.[145] Although repex is to some extent predictable it can be lumpy depending on the age of the distributor's

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143 Jemena, *Regulatory Proposal 2016–20*, April 2015, p. 70.

144 CCP3, *Response to AER preliminary decisions and revised proposals from Victorian electricity distribution network service providers for a revenue reset for the 2016-2020 regulatory period*, 22 February 2016, pp 19–20.

145 VEUCA, *Submission: AER preliminary 2016–20 revenue determinations for the Victorian*, 6 January 2016, pp. 38–40.

population of assets. Our repex forecast takes into account the age profile of the network assets. As such, increases in forecast repex that may not be in line with trend analysis may reflect Jemena's ageing assets.

Predictive modelling

In our preliminary decision, we used predictive modelling to estimate how much repex Jemena is expected to need in the future, given how old its existing assets are, and based on when it is likely to replace the assets. We modelled six asset groups using the repex model. These were poles, overhead conductors, underground cables, service lines, transformers and switchgear.

In our preliminary decision we were satisfied that an amount of $114 million of proposed repex for these six categories of assets was a reasonable estimate for the categories of repex that were subject to our predictive modelling. In its revised proposal, Jemena accepted our preliminary determination for the six categories of expenditure modelled using the repex model.[146]

VECUA noted that the distributors' asset life estimates in the RINs appeared to understate the asset lives achieved in practice compared to the calibrated asset lives which reflect the distributors' actual replacement practices. VECUA was of the view we should move to standardising asset lives across distributors.[147] VECUA also considered that the repex model relied too heavily on asset age and that we gave insufficient consideration to asset condition information.[148] We consider our use of calibrated asset lives addresses this concern as the asset lives are derived from a distributor's revealed replacement approach. A distributor's replacement approach will reflect several considerations including the age of the asset, but also how it manages risk on its network. It may be prudent for one distributor to replace an asset at a certain time on its network, but this same timing may not be prudent for the same asset on a different distributor's network. This may be because there may differences in operating environments and as such the nature of the risk may differ. The use of calibrated replacement lives captures a distributor's recent replacement practices and the age of all its assets in commission. This is expected to reflect the relevant factors the distributor considers when replacing its assets.

For the reasons set out in our preliminary decision, we accept Jemena's proposed amount of $114 million for the six asset categories that have been assessed by our predictive modelling.[149]

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146 Jemena, *Revised regulatory proposal*, January 2016, p. 205.

147 VEUCA, *Submission: AER preliminary 2016–20 revenue determinations for the Victorian*, 6 January 2016, p. 41.

148 VECUA, *Submission: AER preliminary 2016–20 revenue determinations for the Victorian*, 6 January 2016, pp. 46–47.

149 AER, preliminary decision, Jemena distribution determination 2016 to 2020, Attachment 6: Capital expenditure, October 2015, pp. 6-74–79.

Un-modelled repex

In our preliminary decision we did not include the following asset categories in our repex modelling:

- supervisory control and data acquisition (SCADA), network control and protection (collectively referred to as SCADA)
- pole top structures; and
- assets identified in the "other" category.

These categories of assets account for around 43 per cent of Jemena's revised regulatory proposal. These asset categories have not generally been considered suitable for repex modelling either because of lack of commonality, or because we did not possess sufficient data to include them in the model (see appendix E of our preliminary determination).

The Victorian Government considered there was limited assessment of the distributor's proposed expenditure on SCADA systems, noting that where forecast repex was lower than historic that we had accepted the forecast. It considered this approach may incentivise distributors' to achieve a more consistent level of spending, rather than incur lumpy expenditure that would be expected for these expenditure categories.[150] VECUA considered we had not justified our decision on repex forecasts for un-modelled repex categories on the basis of the distributors' 2011–15 historic repex.[151]

We recognise there will be period-on-period changes to repex requirements that reflect the lumpiness of the installation of assets in the past. Using predictive tools such as the repex model allows us to take this lumpiness into account in our assessment. For repex categories we do not model, historical expenditure is used as a high level indicator of the prudency and efficiency of the proposed expenditure. Where past expenditure was sufficient to meet the capex criteria, we are satisfied that it can be a reasonable indicator of whether forecast repex is likely to reflect the capex criteria.[152]

Jemena accepted our preliminary decision for pole top structures, SCADA and 'other' repex. For the reasons set out in our preliminary decision, we accepted Jemena's proposed amounts for pole top structures, SCADA and 'other' repex:[153]

- For pole top structures we considered repex was likely to be relatively recurrent between periods, and that historical repex can be used as a good guide when assessing Jemena's forecast. Given Jemena's forecast was consistent with its expenditure in the last period, we were satisfied that Jemena's forecast repex for

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150 Victorian Government, *Sub on the Victorian electricity distribution network service providers' preliminary decision for 2016-20*, 14 January 2016, p. 6.

151 VECUA, *Submission: AER preliminary 2016–20 revenue determinations for the Victorian DNSPs*, 6 January, p. 45.

152 AER, *Expenditure Forecast Assessment Guideline for Electricity Distribution*, November 2013, pp. 7–9.

153 AER, *Preliminary decision, Jemena distribution determination 2016 to 2020, Attachment 6: Capital expenditure*, October 2015, pp. 6-68–6-74.

pole top structures reasonably reflected the capex criteria and included this amount in our alternative estimate of total forecast capex.

- For SCADA we considered the information explaining the reasons for the proposed increase were not sufficient. However, Jemena had provided sufficient data allowing us to use predictive modelling to test part of the estimate. This supported Jemena's proposed increase. The remainder of the increase appeared to be explained in Jemena's supporting business cases. We were of the view these contained sufficient detail and options analysis to justify the remainder of the proposed step increase. We were satisfied Jemena's proposed increase to SCADA repex was sufficiently justified and included this amount in our alternative estimate of total forecast capex.
- The driver of the increase in forecast 'other' expenditure was attributable to the category Special Capital Works. The step increase was because Jemena reclassified this service from an alternative control service to a standard control service. The amount of forecast repex for the category aligned with the average of the last five years expenditure, and was supported by Jemena's consultant.[154] For the remaining 'other' repex we considered repex was likely to be relatively recurrent between periods, and that historical repex can be used as a reliable guide when assessing Jemena's forecast. After excluding the Special Capital Works category, Jemena's forecast repex for the remainder of the other asset group was consistent with its expenditure in the last regulatory control period. We were satisfied that Jemena's forecast repex for 'other' reasonably reflected the capex criteria and included this amount in our alternative estimate of total forecast capex.

Preston conversion project

Jemena's revised proposal for repex was higher than our preliminary decision, reflecting Jemena's reclassification of the Preston Conversion project from augex to repex.[155] We have accepted this proposed project. Our assessment of this expenditure is in section B.7.

Network health indicators

In our preliminary decision, we looked at network health indicators to form high level observations about whether Jemena' past replacement practices have allowed it to meet the capex objectives. While this has not been used directly to accept Jemena' repex proposal, the findings are consistent with our overall findings on repex. In summary we observed that:

- The measures of reliability and asset failures show that outages on Jemena' network have been stable across time with the exception of a sharp decrease in SAIFI in 2010.

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[154] Jemena, *Regulatory Proposal 2016–20: Attachment 7.3 – forecast capital expenditure by category*, April 2015, p. 65.

[155] Jemena revised proposal, January 2016, pp. 41–42.

- Measures of Jemena' network assets residual service lives and age show that the overall age of the network is being maintained. Using age as a high level proxy for condition, this suggests that historical replacement expenditures have been sufficient to maintain the condition of the network.
- Asset utilisation has reduced in recent years which means assets are more lightly loaded, this is likely to have a positive impact on overall asset condition.

Further, the value of customer reliability has recently fallen. Other things being equal, reductions in the value customers place on reliability should allow Jemena to defer some capex.

The above indicators generally suggest that replacement expenditure in the past period has been sufficient to allow Jemena to meet the capex objectives. This is consistent with our overall findings on repex from our other assessment techniques. The asset health indicators are discussed in more detail in our preliminary decision.[156]

[156] AER, Preliminary decision, Jemena distribution determination 2016 to 2020, Attachment 6 Capital expenditure, October 2015, pp.6-83-6-86

B.5 Forecast capitalised overheads

Capitalised overheads are costs associated with capital works that have been capitalised in accordance with Jemena's capitalisation policy. They are generally costs shared across different assets and cost centres.

B.5.1 Position

We accept Jemena's proposed capitalised overheads forecast of $168.6 million ($2015). We are satisfied that this amount reasonably reflects the capex criteria.

B.5.2 Our assessment

As we noted in our preliminary decision, our assessment in the Queensland distribution determinations found Energex's overheads comprised 75 per cent fixed and 25 per cent variable components.[157] We considered this split of fixed and variable overheads components was also reasonable for Jemena. We invited Jemena to provide a more appropriate split, with evidence, in its revised regulatory proposal if it did not consider this split is reasonable for its circumstance.[158]

Jemena did not comment on this split in its revised proposal. It also used the method in our preliminary decision when calculating the overheads component of its capex forecast, including the 75 per cent fixed to 25 per cent variable split.[159]

Origin agreed that reductions in forecast expenditure should see a reduction in the size of both the total overheads and the level of capitalised overheads.[160] On the other hand, Origin also considered the proposed overheads required further examination.[161] Similarly, VECUA did not agree with the preliminary decisions' method of adjusting overheads on the basis of the distributor's capex forecast. Rather, VECUA recommended we determine efficient capitalised overheads based on benchmark efficient costs.[162]

We undertook a detailed investigation on the relationship between overheads and capex during the NSW and ACT distribution determinations. We accepted that a portion of overheads are relatively fixed in the short term and so does not vary with the level of expenditure. Our analysis also suggested a portion of overheads should vary in relation to the size of the expenditure. Due to data and other issues, however, we

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157 AER, *Preliminary decision: Jemena distribution determination 2016−20: Attachment 6 − Capital expenditure*, October 2015, p. 93.

158 AER, *Preliminary decision: Jemena distribution determination 2016−20: Attachment 6 − Capital expenditure*, October 2015, p. 93.

159 AER, *Preliminary decision: Jemena distribution determination 2016−20: Attachment 6 − Capital expenditure*, October 2015, pp. 30–31.

160 Origin, *Submission to AER preliminary decision Victorian networks*, 6 January 2016, p. 2.

161 Origin, *Submission: Victorian networks revised proposals*, 4 February 2016, p. 1.

162 VECUA, *Submission: AER preliminary 2016–20 revenue determinations for the Victorian DNSPs*, 6 January 2016, pp. 4, 55–56.

considered our proposed method was not sufficiently robust to enable a mechanistic adjustment to a distributor's capitalised overheads.[163] Without evidence to the contrary, we consider our assessment approach from the Queensland distribution determinations results in capitalised overheads that reasonable reflect the capex criteria. We look to refining our approach to assessing overheads as an on-going process.

We have also considered the relationship between opex and capex, specifically whether it is necessary to account for the way the CAM allocates overheads between capex and opex in making this decision. We considered this was not necessary in order to satisfy the capex criteria. This is because our opex assessment sets the efficient level of opex inclusive of overheads. It has accounted for the efficient level of overheads required to deliver the opex program by applying techniques which utilise the best available data and information for opex.

The starting point of our capitalised overheads assessment is Jemena's proposal, which is based on their CAM. As such, Jemena's forecast application of the CAM underlies our estimate. In assessing Jemena's forecast capitalised overheads we accounted for there being a fixed proportion of capitalised overheads.

In this final decision we have accepted Jemena's direct capex that attract overheads. We are also satisfied that Jemena applied our preliminary decision approach to the calculation of its proposed capitalised overheads. Therefore we consider that Jemena's proposed capitalised overheads of $168.6 million ($2015) reasonably reflect the capex criteria.

[163] AER, *Final decision: Ausgrid distribution determination 2015−16 to 2018−19: Attachment 6 – Capital expenditure*, April 2015, pp. 83–84; AER, *Final decision: Essential Energy distribution determination 2015−16 to 2018−19: Attachment 6 – Capital expenditure*, April 2015, pp. 90–91; AER, *Final decision: Endeavour Energy distribution determination 2015−16 to 2018−19: Attachment 6 – Capital expenditure*, April 2015, pp. 61–62; AER, *Final decision: ActewAGL distribution determination 2015−16 to 2018−19: Attachment 6 – Capital expenditure*, April 2015, pp. 73–74.

B.6 Forecast non-network capex

Non-network capex for Jemena includes expenditure on information and communications technology (ICT), buildings and property, motor vehicles, tools and equipment. Jemena's revised proposal includes forecast non-network capex of $161.7 million ($2015). This is an increase of $24.5 million from Jemena's initial proposal of $137.2 million, and an increase of $25.9 million from our preliminary decision for non-network capex of $135.9 million.[164]

B.6.1 Position

We accept Jemena's revised proposal for non-network capex. We have included an amount of $161.7 million ($2015) for forecast non-network capex in our capex estimate. As discussed below, we are satisfied that Jemena's forecast non-network ICT capex reasonably reflects the efficient costs a prudent operator would require to achieve the capex objectives.[165]

In coming to this view:

- We are satisfied that Jemena's forecast ICT capex for the Power of Choice related projects reasonably reflects the prudent and efficient costs required to meet the identified regulatory obligations.
- We are satisfied that Jemena's forecast ICT capex for RIN reporting compliance reasonably reflects an efficient opex to capex trade-off which minimises the total cost to customers of achieving compliance with RIN reporting requirements.
- We are satisfied that Jemena's forecast capex for the motor vehicles, buildings and property, and plant and equipment categories of non-network capex, consistent with our preliminary decision, reasonably reflects the efficient costs of a prudent operator.

B.6.2 Revised proposal

In its revised proposal, Jemena accepted our preliminary decision on forecast non-network capex for motor vehicles, buildings and property, tools and equipment. However, Jemena sought additional ICT capex of $25.4 million ($2015) to comply with the AEMC's rule changes relating to the Power of Choice review, and $2.1 million ($2015) for system upgrades to meet RIN reporting obligations.[166] These two elements of non-network ICT capex are discussed below.

We received one submission on ICT capex from the Consumer Challenge Panel. The CCP submitted that it is concerned about the high level of ICT capex being sought by all the Victorian distributors. It noted that all distributors are forecasting non-network

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[164] Jemena, *Revised regulatory proposal*, 6 January 2016, p. 42.

[165] NER, cl. 6.5.7(c).

[166] Jemena, *Attachment 7–1 - Capital expenditure*, 6 January 2016, pp. 34–35.

capex well above the long term averages of the 2001–2010 period.[167] We note the CCP's general concern about the high levels of ICT capex proposed but take the view that the historic spending from 2001–2010 is not necessarily the best guide to the prudent and efficient level of ICT spending for the current regulatory period. In our assessment, we recognise that ICT expenditure is typically lumpy and its timing is dependent on necessary system upgrades, technology obsolescence, as well as other requirements such as new regulatory obligations.

B.6.3 Information and communications technology capex

Power of Choice projects

In its revised proposal, Jemena proposed $25.4 million ($2015) for capex for Power of Choice projects. We accept this proposed forecast and have included it in our capex estimate.

Since 2014 the AEMC has made several rule changes relating to its Power of Choice review, including in November 2015 making rules for the introduction of metering contestability. These various rule changes give rise to new regulatory obligations for distributors. Following assessment of the various projects, we accept that there is evidence that some capex will be required to ensure compliance with certain of these regulatory obligations. Under the capital expenditure objectives, we must allow sufficient capex to allow a distributor to comply with regulatory obligations or requirements.[168]

As noted above, the CCP submitted that it was not convinced that there is a need to increase ICT costs to accommodate the Power of Choice rule changes, noting that the AEMC did not explicitly identify any costs that it expected to be incurred as a result of the changes.[169] However, following our assessment, we are satisfied the distributors, including Jemena, have demonstrated that they will need to modify their ICT systems to address certain new obligations. We note the CCP is concerned also by the difference in costs proposed by each distributor in relation to the Power of Choice rule changes.[170] We address these differences in our assessment below.

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167 Consumer Challenge Panel CCP3, *Response to the AER Preliminary Decisions and revised proposed for Victorian electricity distribution network service providers for a revenue reset for the 2016–2020 regulatory period*, 25 February 2016, p. 61.

168 NER, cl. 6.5.7(a)(2).

169 Consumer Challenge Panel CCP3, *Response to the AER Preliminary Decisions and revised proposed for Victorian electricity distribution network service providers for a revenue reset for the 2016–2020 regulatory period*, 25 February 2016, p. 63.

170 Consumer Challenge Panel CCP3, *Response to the AER Preliminary Decisions and revised proposed for Victorian electricity distribution network service providers for a revenue reset for the 2016–2020 regulatory period*, 25 February 2016, p. 63.

Assessment approach

In assessing AusNet Services' Power of Choice program, we have examined the proposed projects and identified which of these are in response to regulatory obligations.

We evaluated the projects proposed by each distributor as set out in its proposal. Where a distributor's project costs were not fully supported by a detailed business case with sufficiently supported cost estimation, we also sought further information from the distributor in relation to how the capex forecast was derived. We recognise that the Victorian distributors for the most part have not been able to provide detailed assessment of the capex required or completed a detailed business case for these projects. This is understandable given that these rule changes are recent and there is still time to complete more detailed project plans before implementation is required.

As part of our assessment, we also had regard to information provided by all of the Victorian distributors given that each must meet the same regulatory obligations and are subject to the same operating environment. The fact that the obligations and the operating environment apply to all the Victorian distributors, this allows for a degree of comparability in assessing proposed costs. Accordingly, where the distributor's justification for forecast costs did not justify the capex proposed, we considered the distributor's proposed capex compared to what other Victorian distributors proposed to address that particular regulatory obligation. We then examined the distributor's proposal in order to assess any factors that might explain the need for different capex requirements.

Jemena's Power of Choice program

Jemena did not propose any expenditure for Power of Choice projects in its initial proposal. Instead, in the initial proposal, Jemena proposed to recover these costs through a nominated pass through event for the end of metering derogation.[171] In our preliminary decision we rejected this proposed pass through event because it would be covered under the prescribed regulatory change and/or service events set out in the NER.[172]

In its revised proposal Jemena proposed this additional ICT capex in its forecast both because of our rejection of the proposed pass through event and because of new information regarding the certainty and cost impact of the Power of Choice reforms.[173]

Jemena included $25.4 million for the ICT capex costs for Power of Choice in its revised proposal.[174] Jemena proposed the additional ICT capex for projects to address the following initiatives from the Power of Choice review:

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171 Jemena, *Attachment 7–1 - Capital expenditure*, 6 January 2016, pp. 33–34.
172 Jemena, *Attachment 7–1 - Capital expenditure*, 6 January 2016, p. 34.
173 Jemena, *Attachment 7–1 - Capital expenditure*, 6 January 2016, p. 34.
174 Jemena, *Attachment 7–17 - Power of Choice business case*, 6 January 2016, p. 64.

- Distribution Network Pricing ($2.7 million)
- Metering Competition and Shared Market Protocol (SMP) ($20.5 million; $17.7 million for metering competition and $2.9 million for SMP)
- Customer Access to Data ($1.9 million).

Our assessment of these projects is detailed below.

Distribution Network Pricing

The AEMC made a final rule change for distribution network pricing arrangements in November 2014. The proposed distribution network pricing arrangements project is to address the requirement that network prices reflect the efficient costs of providing network services to individual consumers so that they can make informed decisions about their electricity usage.[175] This rule change introduces new regulatory obligations for distributors from 2017. We accept that these obligations will require Jemena to make changes to its IT systems, resulting in additional capex costs.

We also recognise that the Victorian Government has specified that customers will need to opt in to these new network tariffs from their current tariffs, rather than opt out as specified in the rules. While this is likely to reduce the volume of transactions and may result in lower ongoing costs during the 2016-20 regulatory control period as customer take up may be less than initially estimated, we are satisfied that these obligations will require Jemena to make changes to its ICT systems and processes.

Metering Competition and Shared Market Protocol

The metering competition rule change will introduce competition in metering and facilitate a market led deployment of advanced meters.[176] The SMP project will provide a standard form of communication for energy companies seeking access to services enabled by advanced meters. The SMP rule change seeks to update the B2B framework to provide for the new services that will be available through advanced meters.

The relevant AEMC rule change for the metering contestability project places new regulatory obligations on Jemena. Jemena submitted that these obligations will require it to make changes to its ICT systems to comply with the new rules. For SMP, the AEMC has released a final advice in December 2015, so the final form of these changes is not entirely known.[177] However, these obligations are intended to have the same implementation date as metering contestability (1 December 2017) and Jemena (and other distributors) submitted that they are inextricably linked to the metering

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175 *National Electricity Amendment (Distribution Network Pricing Arrangements) Rule 2014 No. 9.*

176 *National Electricity Amendment (Expanding competition in metering and related services) Rule 2015 No. 12*.

177 AEMC, *Final advice: Implementation advice on the shared market protocol*, 8 October 2015. AEMC, *Consultation paper: National Electricity Amendment (Updating the electricity B2B framework) Rule 2015*, 17 December 2015.

contestability changes and that implementing them together will provide efficiencies.[178] Given SMP is closely linked to the metering requirements, Jemena will need to meet these regulatory obligations.

Customer Access to Data

Jemena's customer access to data project is proposed to comply with the new Metering Data Provision Procedures developed by AEMO which came into effect on 1 March 2016.[179] These Procedures make it easier for customers to get their electricity consumption data from their distributor. We note that that the implementation date was 1 March 2016, which suggests that the majority of capex may already have been incurred in the previous regulatory control period. However, Jemena submitted that it is currently in a 'system change freeze' to support a large scale IT change. Therefore, it has not made any system changes for these new obligations. Instead, Jemena advised that it has developed a manual interim solution.[180] Jemena further submitted that once the system change freeze ends in June, Jemena will commence IT changes for this project, with completion by the end of 2016.[181] On the basis of these Procedures, we accept that there is a regulatory obligation that Jemena must comply with resulting in potential compliance costs.

Assessment of consumer data access, metering competition, and network pricing estimate

Jemena provided a high level business case for the Power of Choice projects which included the headline cost of each project which provided some breakdowns of the forecast costs.[182] It also provided a report from Deloitte Access Economics (DAE) reviewing Jemena's business case for these projects.[183] DAE reviewed Jemena's costs forecasts based on the assumptions and data provided by Jemena. DAE supported Jemena's business case but qualified this support. In particular, DAE stated that it has not assessed Jemena's information and assumptions but considered that on the basis of these assumptions, that Jemena's forecast was efficient.[184] We sought further information from Jemena on the details and justification for its Power of Choice expenditure on three occasions.[185]

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178 AusNet Services, *AER information request - AusNet Services - #036 - IT capex for Power of Choice, 18 February 2016*, pp. 5–6.

179 AEMO, *Metering Data Provision Procedures*, September 2015.

180 We understand that from 1 March 2016, Victorian distributors will be testing 'format 8', a new file format for Victorian Energy Compare (VEC), which is compatible with the AEMO requirements. This format is to be tested for six months until 1 September 2016, when it will become a standard file format for VEC.

181 Jemena, *JEN AER IR#048, Response to AER questions*, 21 March 2016, p. 1.

182 Jemena, *Attachment 7–17 - Power of Choice business case*, 6 January 2016.

183 Jemena, *Attachment 7–18 - Deloitte Access Economics - Power of Choice business case support*, 6 January 2016.

184 Jemena, *Attachment 7–18 - Deloitte Access Economics - Power of Choice business case support*, 6 January 2016, p. 2.

185 Jemena, *JEN AER IR#036, Response to AER questions*, 18 February 2016. Jemena, *JEN AER IR#043, Response to AER questions*, 3 March 2016. Jemena, *JEN AER IR#048, Response to AER questions*, 21 March 2016.

In assessing Jemena's forecast costs, we compared its forecasts to those of the other Victorian distributors. Jemena's costs were in line with those of United Energy and CitiPower/Powercor,[186] with AusNet Services forecasting higher costs, as can be seen in Table 6.10. Jemena and United Energy were the only two distributors to propose customer access to data projects.

Table 6.10 Range of forecast costs for Power of Choice projects

Project	Jemena	AusNet Services	CitiPower/Powercor	United Energy	Average
Metering competition	$17.70 million	$27.80 million	$14.25 million	$14.29 million	$15.41 million[(a)]
SMP	$2.89 million	$6.57 million	$2.08 million	$3.69 million	$2.89 million[(a)]
Distribution network pricing	$2.71 million	$5.86 million	$0	$2.79 million	$2.75 million[(a)]
CAD	$1.90 million	$0	$0	$2.50 million	$2.20 million[(a)]
Total	**$25.10 million**	**$39.23 million**	**$16.33 million**	**$23.27 million**	**$23.25 million(a)**

Source: AER analysis.

Note: Where a distributor proposed an amount of $0 for a project, this was not included in the calculation of the average. (a) this excludes AusNet Services from the average.

We note that Jemena has provided us with only high level information and has not yet undertaken a detailed business case for these projects. However, we further observe that the proposed costs for meeting the same obligations are similar to the average costs in aggregate compared for these projects to those proposed by the other distributors, with the exception of AusNet Services.

Excluding AusNet Services' higher estimates, which we found to be unsupported, Jemena's proposed estimate was comparable to the other distributors' estimates where they proposed capex for a comparable project to address the same regulatory obligation.[187]

We have had regard to the circumstances of the other Victorian distributors which are subject to a similar operating environment (e.g. all of the Victorian distributors have similar metering arrangements and business process obligations). Further, from the information provided by Jemena, we have assessed that the majority of Jemena's costs are capitalised labour costs to amend existing systems and processes. This is similar to the nature of the costs that the other Victorian distributors expect to incur. This provides for a degree of comparability for assessing the proposals submitted by all of the Victorian distributors.

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[186] For these purposes we have considered CitiPower/Powercor as one entity because they share these ICT systems.

[187] All the Victorian distributors proposed comparable projects for metering contestability and SMP/B2B projects; all distributors excepting Powercor/CitiPower proposed comparable projects for network pricing arrangements.

Given Jemena's forecast capex of $25.10 million was similar to the average of $23.25 million (excluding AusNet Services) we are satisfied that this amount reasonably reflects the capex criteria. We have included this amount in our alternative capex estimate.

RIN reporting compliance

In our preliminary decision, we acknowledged that RIN compliance is a new regulatory obligation that may give rise to additional compliance costs. However, on the basis of the information provided by Jemena, we were not satisfied that Jemena's proposed opex step change for RIN compliance costs of $19.7 million ($2015) was efficient. We invited Jemena to provide additional information and evidence in support of its forecast RIN compliance costs.[188]

In its revised proposal, Jemena proposed an alternative RIN compliance solution involving a mix of both capex and opex. Jemena proposed RIN compliance capex of $2.1 million ($2015) for ICT system changes, together with a reduced opex step change of $5.9 million. Jemena's total revised RIN compliance costs of $8.0 million ($2015) reflect a reduction of $11.7 million or 59 per cent from its initial proposal.

Origin Energy submitted that it does not support the inclusion of expenditure for system upgrades associated with regulatory reporting obligations. Origin Energy recognised that the businesses may incur some costs to enhance systems to map data from existing systems into the RIN format. However, Origin Energy submitted that these costs would not be material as the majority of information would be captured as a matter of course and the mapping into the AER format would not be onerous.[189] Jemena identified the scope of work required to achieve compliance as including:[190]

- creation of data entry screens to capture specific data objects required for RIN reporting
- development of reports that tie related information together for simpler, faster and auditable RIN reporting
- change business processes to ensure relevant RIN data is captured
- data collection exercises to capture data not required in the ordinary course of business, such as number of trees per maintenance span and accessibility to poles/spans by standard vehicle
- loading data captured by spreadsheet into the SAP solution
- change management and training of staff affected by system and process changes.

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188 AER, *Preliminary decision - Jemena distribution determination 2016–2020 - Attachment 7 - Operating expenditure*, October 2015, pp. 7-78 to 7-81.

189 Origin Energy, *Re: Submission to AER Preliminary Decision Victorian Networks*, 6 January 2016, p. 2.

190 Jemena, *Attachment 8–11 - Business case for RIN actuals*, 6 January 2016, p. 12.

In our view, these issues reflect both the likely need to re-map existing data as identified by Origin Energy but also the need for new data acquisition, storage and manipulation processes and capabilities. In our preliminary decision, we acknowledged that RIN compliance, including the requirement to report 'actual' rather than 'estimated' data, is a new regulatory obligation that may give rise to justifiable compliance costs.[191] Each business is starting from a different position regarding its existing systems and data availability. While it is possible that RIN compliance costs may be relatively immaterial for some businesses, in other cases they may be more significant. In assessing the need for any RIN compliance costs, we must be satisfied that they reflect the efficient costs that a prudent operator would require to comply with its regulatory obligations.[192] This will maximise the net benefits of RIN reporting to consumers in terms of enhanced industry efficiency, transparency, governance and data availability.

In developing its revised proposal, Jemena refined its approach to producing the required regulatory data and sought advice from its external auditors KPMG to confirm that the proposed approach would yield data for which a positive assurance report could be provided. As a result of this review process, Jemena identified that its new data collection and processing arrangements can be achieved at a significantly lower cost than its initial proposal.[193]

Jemena submitted a detailed business case in support of its revised forecast RIN compliance costs. This business case addressed a number of key factors relevant to assessing the prudence and efficiency of a proposed capex project, including.

- a detailed description of the need for investment, with supporting evidence as to the current state of ICT and business systems and processes[194]
- evidence that a suitable range of alternative options, including a 'do nothing' option, has been considered[195]
- evidence of a formal risk analysis performed as part of the options analysis process[196]
- an analysis of costs and benefits of the preferred option[197]
- evidence that the lowest cost option which meets regulatory requirements has been selected such that the preferred option is economically justified.

Jemena's preferred option for achieving RIN compliance, including the need to provide 'actual' rather than 'estimated' business data into the future, relies on a mix of both ICT

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191 AER, *Preliminary decision - Jemena distribution determination 2016–2020 - Attachment 7 - Operating expenditure*, October 2015, pp. 7-78 to 7-81.

192 NER, cl. 6.5.7(c).

193 Jemena, *Attachment 8–11 - Business case for RIN actuals*, 6 January 2016, p. 2.

194 Jemena, *Attachment 8–11 - Business case for RIN actuals*, 6 January 2016, pp. 4-12.

195 Jemena, *Attachment 8–11 - Business case for RIN actuals*, 6 January 2016, pp. 13-19.

196 Jemena, *Attachment 8–11 - Business case for RIN actuals*, 6 January 2016, pp. 20-26.

197 Jemena, *Attachment 8–11 - Business case for RIN actuals*, 6 January 2016, pp. 27–32.

system changes (capex) and business process changes (opex). Jemena's business case demonstrates that the total cost of this approach is lower than the alternative options identified, which rely on manual workarounds and business process changes without changes to ICT systems.[198] As such, we are satisfied that the forecast ICT capex contributes to the overall efficiency of Jemena's proposed RIN compliance solution through the efficient substitution of capex for opex.[199]

In its revised proposal, Jemena compared its proposed RIN compliance costs to those proposed by other distributors. Jemena noted that its forecast costs are 'as efficient as the most efficient option that has been proposed and/or approved by the AER'.[200] However, this view does not account for those distributors which have not sought any specific RIN compliance costs, such as AusNet Services in Victoria or distributors in Queensland and New South Wales. Nonetheless, we recognise that each business is starting from a different position regarding its existing systems, processes and data availability. In this regard, Jemena's investment in a new Enterprise Resource Planning system in the 2011–15 regulatory control period has assisted in reducing the additional costs now required to achieve RIN reporting compliance in the 2016–20 regulatory control period.[201] In our view, Jemena's proposed approach to build on this investment through additional minor system changes is prudent, and likely to be the most efficient approach to complying with this regulatory obligation.

In summary, having reviewed the information submitted by Jemena in support of the forecast RIN compliance capex, we are satisfied that Jemena's revised proposal capex for the RIN reporting compliance project reflects a reasonable estimate of the efficient costs of a prudent operator.[202] The business case submitted by Jemena supports the proposed option for achieving RIN compliance at a substantially lower cost than Jemena's initial proposal through an efficient opex/capex trade-off. We will make allowance for Jemena's forecast RIN compliance capex in our estimate of non-network ICT capex. Jemena's forecast RIN compliance opex step change is discussed in attachment 7 of this final decision.

198 Jemena, *Attachment 8–11 - Business case for RIN actuals*, 6 January 2016, pp. ix-x.
199 NER, cl. 6.5.7(e)(7).
200 Jemena, *Attachment 8–11 - Business case for RIN actuals*, 6 January 2016, p. 30.
201 Jemena, *Attachment 8–11 - Business case for RIN actuals*, 6 January 2016, p. 5.
202 NER, cl. 6.5.7(c).

C Demand

The expected maximum demand is a key input into a distributor's forecast capex and opex and to our assessment of that forecast expenditure.[203] This attachment sets out our decision on Jemena's forecast maximum demand for the 2016–20 period.[204]

Forecast system maximum demand provides a high level indication of the need for expenditure on the network. Forecasts of increasing system demand generally signal an increased requirement for growth capex, and the converse for forecasts of stagnant or falling system demand.[205] Accurate, or at least unbiased, demand forecasts are important inputs to ensuring efficient levels of investment in the network. For example, overestimates of expected demand may lead to inefficient expenditure as distributors install unnecessary capacity in the network.

We are satisfied that Jemena's forecast maximum demand for the 2016–20 period is a realistic expectation of demand.[206] This is because Jemena's revised forecast aligns with independent forecasts from the Australian Energy Market Operator (AEMO) and is consistent with recent trends in maximum demand on Jemena's network.

In our preliminary decision, we accepted that Jemena maximum demand forecasts reflected a realistic expectation of demand over the 2015–20 regulatory control period. This was because:[207]

- Jemena adopted a similar methodology as AEMO, whose independent forecasts we considered best explain the actual demand pattern seen on all distributors' networks.
- While Jemena proposed some small growth in maximum demand over 2016–20, it is broadly in line with average actual demand experienced over the 2011–15 period and significantly less than the growth in demand previously experienced prior to 2010.
- Jemena's forecast was similar to AEMO's in the beginning of the 2016–20 regulatory control period (which we used as an independent comparison), in particular at the 10 PoE level.

At the time of our preliminary decision, Jemena (and the Victorian electricity businesses) were in the process of updating their demand forecasts as part of the 2015 distribution annual planning report (DAPR). In addition, AEMO updated their most

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[203] NER, cll. 6.5.6(c)(3) and 6.5.7(c)(3).

[204] In this section, demand refers to summer peak demand (MW), unless otherwise indicated. The demand data reviewed in this section are non-coincident summer peak demand data with probability of exceedance (POE) of 10 percent and has been weather adjusted and summated at the transmission connection point level.

[205] Other factors, such as network utilisation, are also important high level indicators of growth capex requirements.

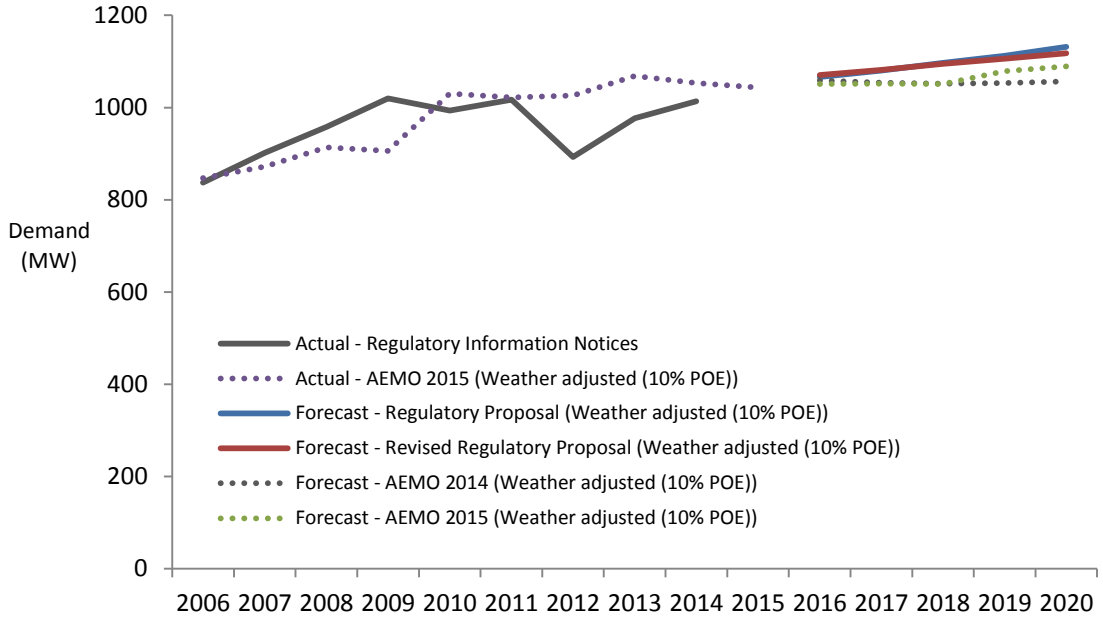
[206] NER, cll. 6.5.6(c)(3) and 6.5.7(c)(3).

[207] AER, *Preliminary decision, Jemena determination 2016 to 2020, Attachment 6 – Capital expenditure,* April 2015, pp. 100–113.

recent Victorian maximum demand forecast, which was too late to be considered as part of our preliminary decision. Hence, we stated that we would consider updated demand forecasts and other information (such as AEMO's most recent demand forecasts) in our final decision.

Jemena has revised its demand forecast to take into account data for the most recent summer (2014–15). As shown in Figure 6.10 Jemena's revised demand forecast is marginally lower than its original forecast, but is largely unchanged. Jemena has not changed or revised its demand forecasting methodology.

Figure 6.10 Jemena maximum demand forecasts



Source: AER analysis, Jemena, Reset RIN 2016–20, April 2015; Jemena response to AER information request 029; AEMO, Dynamic interface for connection points in Victoria, September 2014; AEMO, Dynamic interface for connection points in Victoria, 22 December 2015; Jemena, Economic Benchmarking RIN (Actual) for 2006–13; Jemena, Economic Benchmarking RIN (Actual) for 2014.

Note: The actual raw demand for 2015 is not yet available from Jemena.

Consistent with our preliminary decision, we also compared Jemena's revised forecast to AEMO's connection point demand forecasts for Jemena's network. As shown in Figure 6.10, AEMO's updated forecasts are more closely aligned with Jemena's revised forecasts and predict similar average demand growth to Jemena over the 2016-20 period.[208] This lends support to Jemena's revised demand forecasts.

[208] AEMO attributes the increased demand forecast to population and economic growth in Victoria, as well as improvements to its forecasting methodology through adjustments for historical rooftop PV and the reconciliation process. See AEMO, 2015 AEMO transmission connection point forecasting report for Victoria, September 2015, pp. 4, 8.

In two separate submissions, Origin Energy and AGL express support for our use of the latest AEMO connection point forecast in our assessment process.[209]

- In our preliminary decision, we compared Jemena's demand forecast with Jemena's actual historical demand during the 2006 to 2015 period. For our final decision we have enhanced this analysis by using weather adjusted historical demand data which enables us to draw more robust inferences about changes in the underlying level of demand for electricity from the historic data.[210]
- As shown in Figure 6.10, Jemena's weather adjusted historical demand shows a flattening of maximum demand growth from 2010. Jemena forecasts significantly less growth in maximum demand than prior to 2010. Furthermore, between 2011 and 2015, it is possible to infer an upwards trend in maximum demand between 2010 and 2015, and Jemena's demand forecasts for the 2016-20 period would be consistent with this trend. These observations are consistent with our preliminary decision.

The Victorian Energy Consumer and User Alliance (VECUA) submitted that the Victorian distributors' maximum demand forecasts show much higher growth rates than AEMO's projections. The VECUA considers that AEMO has over-estimated its energy forecasts in recent years and considers that AEMO's latest forecasts may also be over-estimated. The VECUA considers that the AER should substitute the distributors' demand and energy forecasts with credible independent forecasts. [211]

While we note VECUA's observations, we consider that AEMO's connection point forecasts are different to energy forecasts provided in its National Electricity Forecasting Report (NEFR) because they are forecasted at the connection point level. The Standing Council on Energy and Resources (SCER) and the AEMC both recognised the benefits from providing us with an alternative and independent demand forecast for comparison in our regulatory process. This was due to potentially significant changes in the types and location of electricity generation, technology development and declining patterns of demand which will lead to uncertainty for network investment.

Consistent with policy intention of the development of AEMO's demand forecasting function, we have compared Jemena's (and all other NSP's) demand forecast with AEMO's independent forecast. While this is a new forecast, we have found this to be a useful tool in our recent determinations for the NSW, ACT and Queensland electricity

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209 Origin Energy, *submission to AER preliminary decision Victorian networks*, 6 January 2016, p. 2. AGL, *submission to AER preliminary decision on the Victorian electricity distribution network regulatory proposals*, 7 January 2016, p. 1.

210 Weather adjustment of actual demand data removes the effect of random weather factors on observed electricity demand. This is because random weather factors have a strong impact on peak electricity demand (such as the peaks and troughs in demand between 2009 and 2014).

211 The Victorian Energy Consumer and User Alliance (VECUA), submission to the AER on AER preliminary 2016-20 revenue determinations for the Victorian DNSPs (Developed by Hugh Grant, Executive Director, ResponseAbility), 6 January 2016, pp. 26–27.

distribution businesses. As such, we will continue to use AEMO's connection point forecasts in this determination.

We understand that AEMO will continue to update and improve its methodology over time, including in response to feedback from the businesses in the NEM and other stakeholders. Ultimately the test of accuracy of any forecast will be its performance over time in predicting actual demand.

In its submission on our preliminary decisions for the Victorian electricity distributors, the Victorian Government also notes that the electricity distributors may seek additional expenditures through revised demand forecasts.[212] We review the impact of Jemena's revised demand forecast on augex in section B.2.

[212] The Victorian Government, *Submission to the AER on the Victorian electricity distribution network service providers' preliminary distribution determinations for 2016–20*, January 2016, p. 1.